EXTENT TO WHICH SELECTED VARIABLES DIFFERENTIATE AMONG MORE EFFECTIVE, MODERATELY EFFECTIVE, AND LESS EFFECTIVE SUBSTITUTE TEACHERS IN AN URBAN SCHOOL DISTRICT

By

W. JAMES HALSCOTT

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF DOCTOR OF EDUCATION

UNIVERSITY OF FLORIDA

1985

To Connie, Jaime, and Torre

ACKNOWLEDGEMENTS

I am indebted to many people for their support and assistance throughout this study. Dr. Michael Y. Nunnery, chairperson of my committee, provided the essential expertise, guidance, and support which enabled the completion of the study. Dr. James Hale and Dr. Joseph Shea provided helpful advice at critical times throughout the study.

Special thanks are owed Dr. Robert Cascaddan, through whose encouragement this program of doctorial studies began. Two colleagues, Roy Eldridge and Dennis Reussow, were part of a vital support group which hastened the completion of this work. Finally, I wish to thank my wife Connie and two sons, Torre and Jaime, whose constant support, prodding, and sacrifice will not be forgotten.

TABLE OF CONTENTS

Page

ACKNOWLEDGEMENTS iii

LIST OF TABLES v

ABSTRACT vii

CHAPTER

I INTRODUCTION 1

Statement of the Problem 3
Delimitations 4
Limitations 5
Justification of the Study 7
Assumptions 11
Definition of Terms 11
Procedure 13
Organization of the Study 19

II REVIEW OF THE RELATED LITERATURE 20

Descriptive Data Regarding Substitute Teacher Programs 20
Inherent Problems of Substitute Teacher Programs 23
Literature Related to the Variables Under Investigation 26
Background Variables Related to Regular Teacher Selection 34
The Literature in Brief 38

III PRESENTATION OF DATA 40

Descriptive Data 44
Discriminant Function Analysis Data 53
Interpretation of the Discriminant Function Data 70

IV SUMMARY, DISCUSSION, AND CONCLUSIONS 75

Summary 75
Discussion 83
Conclusions 86

APPENDIX: PROFESSIONAL AND PERSONAL REFERENCES PERSONNEL DEPARTMENT 88

REFERENCES 89

BIOGRAPHICAL SKETCH 93

LIST OF TABLES

Table Page

1 Classification of Substitute Teachers According to Ratings by Principals 15

2 Mean, Standard Deviation, and Range for Age of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 45

3 Sex of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 45

4 Race of Substitute Teacher Rated as More Effective, Moderately Effective, and Less Effective 46

5 Marital Status of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 47

6 Level of Education of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 48

7 Teacher Education Courses of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 49

8 Regular Teacher Certification Status of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 50

9 Work Experience of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 52

10 Mean, Standard Deviation, and Range for Appraisal Variables of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 53

11 Discriminant Functions for Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 55

12 Discriminant Function Coefficients of the Variables Investigated to Discriminate Among Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 56

13 Wilks' Lambdas of the Variables Investigated to Discriminate Among Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 57

Table Page

14 Pooled Within-groups Canonical Correlations Between the Discriminant Functions and Discriminating Variables Regarding Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 59

15 Group Centroids for Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 60

16 Individual Actual Group Classification Compared to Subject Predicted Classification for Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 61

17 Actual Group Classification Compared to Predicted Group Classification of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective 66

18 Pearson Correlation Matrix on the Variables Used to Classify Substitute Teachers as More Effective, Moderately Effective, and Less Effective 69

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Education

EXTENT TO WHICH SELECTED VARIABLES DIFFERENTIATE AMONG MORE EFFECTIVE, MODERATELY EFFECTIVE, AND LESS EFFECTIVE SUBSTITUTE TEACHERS IN AN URBAN SCHOOL DISTRICT

By

W. James Halscott

August 1985

Chairman: Michael Y. Nunnery
Major Department: Educational Leadership

The majority of school districts utilize substitute teachers to provide continuity of instruction during the absence of regular teachers. Increasing teacher absenteeism and a decreasing supply of teachers are resulting in a crisis regarding the quantity and quality of available substitute teachers. An expedient means of employing effective substitutes would be a partial solution to quantity--quality crisis. The focus of this study was to investigate the background variables of individuals employed as substitutes in a large urban school district and to determine the degree to which those variables may be used to select effective substitute teachers.

Building administrators rated 206 currently employed substitute teachers as more, moderately, or less effective. Information available in their personnel records was gathered on nine variables: age, sex, race, marital status, level of education, pedogogical courses, certification, work experience, and references. Group profiles obtained from available data in the substitute teachers' personnel records indicated observable differences among the three groups. The predictive power of the variables with regard to the identification of probable group membership was investigated through the application of discriminant function analysis.

The results of the discriminant analysis indicated that one variable, pedogogical courses, was an important discriminating factor regarding the identification of potentially effective substitute teachers. This finding was diminished in that the combined predictability of all the variables, although greater than chance probability, was less than the district's current practice used to employ substitute teachers. However, the presence of teacher education courses as a discriminant among more effective, moderately effective, and less effective substitute teachers is the basis for an important implication. More specifically, the effectiveness of substitute teachers may be a result of exposure to pedogogical training.

CHAPTER I

INTRODUCTION

The continuity of instruction and program is deemed a basic educational tenet in a complex industrial and technological society. Two serious disruptions to the continuity of instruction are the rising rate of teacher absenteeism and the declining number of teachers (Drake, 1981; McIntire & Hughes, 1982). The vast majority of school districts depend upon the substitute teacher as the medium to provide continuous and meaningful instruction during periods when the regular teacher's services are unavailable (Porwoll, 1977). As the need for substitute teachers becomes increasingly acute, school districts are experiencing two problems regarding the acquisition of substitute teachers, one of quantity and one of quality (Crisis, 1985; McIntire & Hughes, 1982; Reynolds & Garfield, 1971).

The need to increase the quantity of substitute teachers has been attributed to the following factors: illness, teacher turnover, declining number of education graduates, teacher burnout, collectively-bargained release time, expanded opportunities for professional inservice, and teacher shortages (Drake, 1981; Elliot & Manlove, 1977; McIntire & Hughes, 1982). Elliot and Manlove (1977) revealed that 86% of the districts they studied reported steady increases in the use of substitute teachers over the previous 5-year period, even though teacher and student populations declined. McIntire and Hughes (1982) concluded that the increasing deficit resulting from teacher demand exceeding teacher supply would hamper the ability of school districts to secure effective substitute teachers. They felt that ensuing teacher shortages would cause "the most experienced and most effective substitutes" to fill full-time positions and diminish the number of available effective substitute teachers (p.702). Harris (1982) provided further evidence of an increasing demand for teachers accompanied by a decreasing supply of teachers. In a study conducted in Texas, he found a rise in birth rates accompanied by a decline in the number of education graduates. Heikkinen (1982) provided another example of the supply-demand problem when he stated that within the last decade the number of math teachers and science teachers experienced a nationwide decline of 75% and 64%, respectively. Thus, as the supply-demand deficit increases, school districts will have an increasingly difficult time securing individuals who can provide continuous quality instruction.

The second problem, the need to increase the quality of substitute teachers, is illustrated in a study by Olson (1971). He found substitute teachers ranked last when their effectiveness as teachers was compared to teacher aides, student teachers, specialists, and regular teachers. This low effectiveness of substitute teachers was attributed to both the system that hires substitute teachers and to the individuals who serve as substitute teachers. The system failed to provide adequate substitute teachers due to insufficient or nonexistent certification, lesson plans, orientation programs, and inservice (Porwoll, 1977; Rawson, 1981). Substitute teachers are, more often than not, called late, placed out of field, and encouraged to maintain discipline in lieu of teaching (Reynolds & Garfield, 1971; Robb, 1979). Esposito (1975) found fault with the individual substitutes, "many of whom cannot qualify as regular teachers because of personal or academic deficiencies" (p.47). Furthermore he stated "since the pay is usually minimal, many academically qualified people don't even bother to apply" (p.47). Regardless of where causality lies, school districts have an obligation to provide quality instruction.

The presumption of continuous quality education as a basic tenet of modern educational institutions and the rising rate of teacher absenteeism place the onus of procuring a sufficient number of qualified substitute teachers on a school district's personnel department. In 1984-85 the Orange County Public Schools (Florida) personnel department required substitute teacher applicants to supply personal, educational, experiential, and appraisal background information prior to employment. In addition, substitute teachers were interviewed to further ascertain their suitability to instruct pupils. The nature of the study reported herein was on such data and how it could be used by the Orange County Public Schools personnel employees to develop a method of improved selection of substitute teachers.

Statement of the Problem

The focus of the study was on the personal, educational, experiential, and appraisal background variables of a sample of Orange County Public Schools substitute teachers and a determination of the extent to which the variables differentiate among individuals who have been classified as either a more effective substitute teacher, a moderately effective substitute teacher, or a less effective substitute teacher. More specifically, the answers to the following four questions were sought:

1. What are the personal, educational, experiential, and appraisal variables of individuals rated as more effective substitute teachers?
2. What are the personal, educational, experiential, and appraisal variables of individuals rated as moderately effective substitute teachers?
3. What are the personal, educational, experiential, and appraisal variables of individuals rated as less effective substitute teachers?
4. What is the extent to which the personal, educational, experiential, and appraisal variables of substitute teachers discriminate among more effective substitute teachers, moderately effective substitute teachers, and less effective substitute teachers?

Delimitations

1. The sample for the study consisted of 206 Orange County Public Schools substitute teachers employed during the 1984-85 school year and who were categorized by their primary evaluators, the building administrators, into one of three groups, more effective, moderately effective, or less effective. There were 75 individuals in each of the first two groups, more effective and moderately effective, and 56 individuals in the less effective group.
2. The personal variables studied were confined to age, sex, race, and marital status.
3. The educational variables studied were confined to level of education, teacher education, and regular teacher certification.
4. The experiential variables studied were confined to related work

experience, teaching experience, and non-related work experience.

5. The appraisal variables studied were confined to instructional qualities and professional/personal qualities. (The data collected about these two qualities were the data contained on the three personal reference forms collected on each employee and the evaluation of an interview conducted by a member of the Orange County Public Schools personnel department.)
6. There existed little empirical evidence that the characteristics of an effective substitute teacher were congruent with the characteristics of an effective regular teacher. Some authors presumed a complete correlation between the two occupations whereas other authors presumed little or no relationship between the two occupations (Garwood, 1976; McIntire & Hughes, 1982; Robb, 1979). While an empirical determination of a relationship existing between the characteristics of an effective substitute teacher and the characteristics of an effective regular teacher could be a valid and needed area of research, such an endeavor was beyond the scope of this study.

Limitations

1. The ex post facto nature of the study negated the ability to establish internal validity or establish a determination of causality.
2. The external validity of this study exists only to the degree that generalizations drawn from the study are applied to a particular school district similar to the Orange County Public Schools.
3. The study's sample was classified into one of the three categories according to the following criteria:

More effective. An individual rated by the building administrator to be an adequate replacement for an absent teacher, an individual who provided meaningful instruction and maintained order, and an individual who would be requested to return to the school as a substitute teacher.

Moderately effective. An individual rated by the building administrator to be below the building administrator's expectations of an effective substitute teacher and above the building administrator's expectations of an ineffective substitute.

Less effective. An individual rated by the building administrator to be an inadequate replacement for a teacher, an individual who provided little or no meaningful instruction and experienced classroom management problems beyond the scope the building administrator would judge acceptable for a substitute teacher, an individual whose presence the building administrator would consider a waste of the students' time, and an individual who the building administrator would not request to be returned to the school as a substitute teacher.

The classification of the sample by building administrators into one of three groups, more effective, moderately effective, or less effective, was a subjective process and may raise questions concerning the study's validity. The use of this subjective method was deemed appropriate in that it is both practical and expedient. Porwoll (1977) supported this practical and expedient position when he reported only "39.2 percent of all responding school systems formally evaluate the performance of their substitute teachers" and in those systems "the building principal performs the evaluation in 94.7 percent of the school systems" (p.vii). He further reported that "74.6 percent of all responding school systems select substitute teachers for duty primarily on the basis of their past performance" (p. vii). The procedure of having each individual in the sample ranked by three separate building administrators was an attempt to strengthen the study's validity.

4. There existed the possibility that the more time spent by a particular substitute teacher in the same teaching situation could increase that teacher's effectiveness through familiarity with the situation. This familiarity with the teaching situation could affect building administrator ratings. The researcher attempted to reduce the possible effects of skewed ratings, resulting from familiarity with a particular situation, by employing the following procedure. First, the researcher sampled three months in the 1984-85 school year to determine the extent to which substitute teachers were employed longer than two consecutive teaching days in the same teaching situation. Second, the researcher ascertained if the number of substitute teacher assignments longer than two consecutive teaching days, when compared to the number of substitute teaching assignments less than three consecutive days, was significant.

Justification of the Study

Data on the frequency of substitute teacher use and the associated economic costs of substitute teacher programs appeared often in the literature and are reviewed in Chapter II. A survey by Porwoll (1977), although an 8-year old study, presented the only comprehensive summary of national data that allows the reader to focus upon the scope of substitute teacher use. The following excerpts from Porwoll's study are presented to provide some insight regarding the use of substitute teachers:

> Over 90 percent of the large school systems (25,000 or more pupils) and medium school systems (10,000 to 24,999 pupils) and over 60 percent of the small school systems (2,500 to 9,999 pupils) take applications for substitute employment and administer their substitute teacher programs at the central office level, most often by directors of personnel. Employment applications and the substitute teacher programs are administered in very small school systems (300 to 2,499 pupils) by the superintendent and building principal.
>
> 58.6 percent of responding school systems require that substitute teachers hold the same minimum academic degree and teacher certification as regular teachers. The average percent of substitutes holding the same minimum academic degree as regular teachers is 81.1 percent; for teacher certification, 78.5 percent.
>
> Large school systems (25,000 or more pupils) kept an average of 805 names of substitute teachers on active file in 1976-77; medium school systems (10,000 to 24,999 pupils), 197; small school systems (2500 to 9,999 pupils), 108; and very small school districts (300 to 2,499 pupils), 34.
> For every 100 regular teachers employed by all responding school systems, the median system had 26 substitute teachers on active file; the mean for all systems was 35 substitute teachers.
>
> There are an estimated 736,696 substitute teachers nationwide on the rosters of the school systems enrolling 300 or more pupils.
>
> Large school systems (25,000 or more pupils) employed an average of 143 substitute teachers during a typical day in 1976-77; medium school systems (10,000 to 24,999 pupils), 34; small school systems (2,500 to 9,999 pupils), 13; and very small school systems (300 to 2,499 pupils), 3.
>
> 36.3 percent of all responding school systems employed from 10 to 20 percent of their total available substitute teachers during a typical day in 1976-77; 28.9 percent employed less than 10 percent; 19.7 percent employed from 20 to 30 percent.
>
> School systems employed an average of 4.3 percent of substitute teachers during the typical day in 1976-77 as compared with the number of total regular teachers.

> 57.4 percent of all responding school systems had an adequate supply of substitute teachers in 1976-77. Surpluses occurred more often in the medium school systems (10,000 to 24,999 pupils) -- 26.6 percent -- and large school systems (25,000 or more pupils) -- 24.4 percent. Shortages occurred more often in the very small school systems (300 to 2,499 pupils) -- 31.9 percent -- and the small school systems (2,500 to 9,999) -- 20.2 percent.
>
> The average minimum scheduled daily pay rate for substitute teachers in 1976-77 was $26.09, ranging from a low of $10.00 to a high of $54.78. The average maximum scheduled daily pay rate for substitute teachers in 1976-77 was $32.03, ranging from a low of $15.00 to a high of $85.84.
>
> Substitute teachers' salaries in 1975-76 cost an average of $842,670 in large school systems (25,000 or more pupils); $165,619 in medium school systems (10,000 to 24,999 pupils); $56,394 in small systems (2,500 to 9,999 pupils); and $8,000 in very small school systems (300 to 2,499). (pp.VII-VIII)

During the 1983-84 school year, a situation similar to the one depicted by Porwoll (1977) existed in the Orange County Public School. Substitute teachers were employed a total of 24,131 teaching days, an average of 4.6 days of leave per teacher. The total cost of the Orange County Public Schools substitute teacher program was $849,438.28 for the 1983-84 school year (Orange County Public Schools Statistical Report, 1984). In regard to these economic costs, a school district should endeavor to disperse its funds in the most prudent manner. The expedient selection of capable employees prior to actual employment has the advantage of reducing costs associated with the termination and replacement of incompetent employees.

The non-economic costs of an ineffective substitute teacher program are less quantitative than the economic costs. Even so, many authors deemed the non-quantitative effects of an ineffective substitute program as more detrimental than the economic factors. Hayes (1975) attributed 75% of a substitute's energy to the task of keeping order.

Robb (1979) expounded upon the purposelessness and wasted time achieved through out-of-field assignments. Woods and Woods (1974) argued that psychological alienation between the substitute teacher and pupils has a negative effect upon learning. Frosch (1981) posed the question "how often is the substitute teacher viewed by students, faculty, and administrators as just a warm body to be in the classroom?" (p. 84). Esposito (1975) provided an answer to Frosch's rhetorical question:

> The substitute teacher in almost every school system in this nation faces an impossible task. He must attempt effective teaching despite the apathy, and often hostility, of students, administrators, and other faculty members. Usually he has little understanding of what has been studied by the class he is covering, and in most systems he is little more than a "babysitter" or "policeman" to protect the school board from the lawsuits that would probably arise from unsupervised classes. In most systems little concern is felt for the quality of the job done by the substitute. (p.47)

The primary mission of the Orange County Public Schools is to provide quality and meaningful instruction for its pupils. There exists an underlying assumption in this mission that the Orange County Public Schools personnel department has the responsibility of securing the staff to carry out the mission. Thus, a study which provided data that might be useful in the selection process of substitute teachers could be a benefit to the district.

Also, the study was justifiable for two other reasons. First, it expanded the limited knowledge base characteristic of the research on substitute teachers. Secondly, the study reiterated the use of discriminant functional analysis as a useful statistical tool in educational research.

Assumptions

The assumptions basic to the study were as follows:

1. Continuity of instruction is a basic tenant of modern educational institutions.
2. Effective substitute teachers can provide continuity of instruction when the regular teacher is not present.
3. The data recorded in the Orange County Public Schools personnel files are accurate.

Definition of Terms

Appraisal variables. Instructional qualities and professional/personal qualities were included as the appraisal variables. The instructional qualities consisted of enthusiasm for teaching, adaptability to new ideas, ability to discipline, planning and preparation, initiative and creativity, professional attitude, and general rank as a teacher. The professional/personal qualities consisted of work/work habits, ability to work with others, ability to learn, dependability/attendance, attitude, judgment/common sense, initiative, health/emotional stability, personality, and personal appearance. Four individuals rated each substitute teacher regarding the appraisal variables. Three of the individuals who rated a particular substitute teacher were individuals whom the substitute teacher had listed as personal references. The fourth individual who rated each employee was an Orange County Public Schools personnel department person who was responsible for interviewing prospective employees.

Building administrator. An individual designated by the school board to perform or delegate the functions necessary for the daily operation of a school. For the purpose of this study, the term building administrator, unless otherwise stated, referred to the building administrator responsible for the supervision and evaluation of substitute teachers.

Educational variables. Three variables were included as educational variables, the level of institutionalized education, course work related to teacher education, and the presence or absence of certification as a regular teacher.

Experiential variables. Three variables related to the knowledge obtained through work experience were included as experiencial variables, non-teaching related experience, teaching experience, and non-related work experience.

Less effective substitute teacher. An individual rated as an ineffective replacement for a regular teacher on evaluations by at least two building administrators and not rated an effective substitute by the third building administrator.

Moderately effective substitute teacher. An individual rated as a moderately effective replacement for a regular teacher on evaluations by at least two different building administrators.

More effective substitute teacher. An individual rated as an effective replacement for a regular teacher on evaluations by at least two building administrators and not rated an ineffective substitute by the third building administrator.

Non-teaching related experience. Employment experience gained by working with school age children or in a school setting in a capacity other than teaching.

Personal variables. Four variables were included as the personal variables, age, sex, race, and marital status.

Regular teacher. An individual holding a Florida teaching certificate and under a yearly contract to instruct pupils in the Orange County Public Schools.

Substitute teacher. An individual who had been hired on a per diem basis to replace a regular teacher.

Procedure

The purpose of the study was to determine the relationship between data available prior to employment and individuals rated more effective substitute teachers, moderately effective substitute teachers, or less effective substitute teachers. This procedure section of the study is divided into four sections and provides an overview of the mechanical aspects of the study. A brief statement of the study's setting is contained in the first section. A discussion of the methods employed to select the sample is presented in the second section. The categorization of the data for analysis is presented in the third section. Finally, a description of the data analysis procedures is presented in the fourth section.

Setting of the Study

The study was to be conducted in the Orange County Public Schools, a large urban school district located in Central Florida. The school district's jurisdiction encompasses the entire county, 1001 square miles. In 1984, the population of the county was 524,263 of which 17% were classified as members of a minority race. The largest minority, black, comprised 15% of the county's total population. The county derived its economic substance from tourism, manufacturing, agriculture, finance, and trade (Orange County Public Schools Statistical Report, 1984).

In 1984, the Orange County Public Schools maintained 105 instructional facilities, 68 elementary schools, 19 junior high schools, 9 high schools, 4 vocational institutions, 4 exceptional education centers, and an alternative education center. The school population, kindergarten through 12th grade, was 79,279. Racially, the pupil population consisted of 69% white, 24% black, 5% Hispanic, and 2% other (Orange County Public Schools Enrollment Summary, 1984).

Sample Selection

In 1984, the Orange County Public Schools maintained a substitute teacher pool consisting of approximately 750 individuals. The county was divided into three geographic areas so that members of the pool could be assigned to schools within reasonable proximity of their residences. Each geographic area was subdivided according to substitute teacher preference for instructional level: elementary, kindergarten through sixth grade; secondary, seventh grade through twelfth grade; and no preference, all grades. Three central office clerks, each responsible for a particular geographic area, administered the requests for needs and the assignment of substitute teachers.

Each clerk maintained a record regarding each substitute teacher's assignment. From this record, the researcher could determine the frequency of a particular individual's employment as a substitute teacher during a specified year. Furthermore, the researcher could ascertain the names of the schools to which a particular substitute teacher was assigned during a specified year. Utilizing the central office clerks' records, the researcher identified those substitute teachers who had been employed in three or more schools and who had been employed 10 or more days during the 1984-85 school year.

The names of substitute teachers meeting the above criteria were placed on a list for each school at which that substitute taught.

Thus, each individual substitute teacher appeared on at least three separate listings. Each individual on a particular school's list was classified by the building administrator into one of the following three classifications: more effective substitute teacher, moderately effective substitute teacher, or less effective substitute teacher. An individual's classification was established when that individual had been rated three times in the same classification or two times in one classification with the third rating being in the classification adjacent to the two identical ratings. All individuals who were rated in a manner that caused them to be unclassifiable into one of the three classifications were excluded from the study. The classification process terminated when 206 individuals had been rated. Table I illustrates the classification process:

Table I

Classification of Substitute Teachers According to Ratings by Principals

Rating by Principal	Classification
3 more effective	more effective
2 more effective 1 moderately effective	more effective
1 more effective 2 moderately effective	moderately effective
3 moderately effective	moderately effective
2 moderately effective 1 less effective	moderately effective
1 moderately effective 2 less effective	less effective
3 less effective	less effective

Categorization of Data for Analysis

The personnel records of the Orange County Public Schools were the source of the data. The data collected were categorized for analysis as follows:

Personal variables. Age--In years as of the individual's last birthday; sex--female, 0; male, 1; race--white, 0; black, 1; Hispanic, 2; other, 3; and marital status--married, 0; not married, 1.

Education variable. High school graduate, 0; college work without obtaining a degree, 1; bachelor's degree, 2; postbachelor's course work, 3; and postbachelor's degree, 4; teacher education courses--no, 0; yes, 1; and regular teacher certification--no, 0; yes, 1.

Experiential variables. Non-related work experience, 0; non-teaching related experience, 1; and teaching experience, 2.

Appraisal variables. Instructional qualities 0 - 35; and professional/personal qualities 0 - 50. The obtained score for the appraisal variable was calculated from the data contained upon the Orange County Public Schools Professional and Personal Reference form, Appendix. The form contained two sections, one entitled instructional qualities, the other entitled professional/personal qualities. The instructional qualities section consisted of seven items: enthusiasm for teaching, adaptability to new ideas, ability to discipline, planning and preparation, initiative and creativity, professional attitude, and general rank as a teacher. Each of the seven items that comprised the instructional qualities was rated by four separate evaluators along a continuum dichotomized by the following verbal descriptors: excellent, very good, good, fair, poor, and unknown. The researcher assigned a numerical value to each verbal descriptor selected by an evaluator.

Those numerical values were as follows: excellent, 5; very good, 4; good, 3; fair, 2; poor, 1; and unknown, 0. The researcher determined the arithmetic mean of the numerical values assigned to each of the seven instruction qualities items. The sum of the seven means became the individual's obtained instructional qualities score. The researcher used the 10 professional/personal qualities items contained upon the same Orange County Public Schools Professional and Personal Reference form to compute each individual's professional/personal qualities obtained score in a manner identical to the calculation of each individual's instructional qualities obtained score. The professional/personal qualities consisted of quality of work/work habits, ability to work with others, ability to learn, dependability/attendance, attitude, judgment/common sense, initiative, health/emotional stability, personality, and personal appearance. The sum of an individual's instructional qualities obtained score and professional/personal qualities obtained score became the individual's appraisal variable score.

Data Analysis

The major purpose of this study was to determine the degree to which information available prior to employment could be used as a predictor of more effective, moderately effective, or less effective substitute teachers. The statistical technique used to examine the predictive power of pre-employment data was discriminant function analysis. This statistical technique allowed "the researcher to study the differences between two or more groups of objects with respect to several variables simultaneously" (Klecka, 1980, p. 7). The analysis procedure was accomplished though the Discriminant Computer Program of the Statistical Package for the Social Sciences (SPSS). The program produced discriminant functions which contained the weighted and linear combinations of the discriminanting variables in a fashion so that the groups were forced to be as statistically distinct as possible (Klecka, 1980; Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). The reader should note that a discriminant function analysis can result in more than one function if the first function accounts for less than 100% of the variance among the groups. However, the number of functions produced will always be no more than the number of study groups less one. In this study, the SPSS program produced two functions of which the first accounted for 63.4% of the variance and the second accounted for 36.6% of the variance. Furthermore, the SPSS program computed cononical correlations, group centroids (means), Wilks' lambdas, chi-squares, and a Pearson correlation matrix. This information was the basis upon which the researcher interpreted the data and reached conclusions regarding the data.

In summary, the variables which were identifiable prior to employment were analyzed to determine the linear combinations which discriminated among more effective substitute teachers, moderately effective substitute teachers, and less effective substitute teachers. Questions one, two, and three in the Statement of the Problem were answered through an inspection of personnel records found in the personnel department of the Orange County Public Schools. The data gained from this inspection are presented in a tabular format. Question four in the Statement of the Problem was answered through the discriminant functioning analysis of the same data. The independent variables were analyzed by a computer using the SPSS program which produced discriminant function prediction equations that maximized correct classification of the individuals into one of three groups: more effective, moderately effective, or less effective substitute teachers.

Organization of the Study

In chapter I the problem was introduced, justification was provided for the study, and the parameters of the study were stated. In addition, this study contains three additional chapters. Chapter II is a review of the literature relating to substitute teachers. This synthesis of the written material is focused on the descriptive data regarding substitute teacher programs, the inherent problems of substitute teacher programs, the identification and justification of substitute teacher background variables to be studied, the background variables of regular teachers, and a brief summary of the literature reviewed. Chapter III contains the presentation and analysis of the data. Chapter IV contains a summary of the significance regarding the analyzed data and conclusions that may be inferred from that significance.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

The literature review focuses on four areas, descriptive data regarding substitute teacher programs, inherent problems of substitute teacher programs, the variables under investigation, and background variables of regular teachers. Following the review of the literature regarding the four areas, there is a brief summary of the reviewed literature.

Descriptive Data Regarding Substitute Teacher Programs

The descriptive data presented in the literature concentrated on the scope and economic cost of substitute teacher use throughout the nation. Reporting for the Educational Research Services, Inc., Porwoll (1977) conducted a study of substitute teachers in 1158 school districts. Regarding the national scope of substitute teacher programs he found the following:

1. The trend toward centralized control in assignment of substitute teachers increased as the size of the school districts increased.
2. The majority of school systems, 58.6%, required substitute teachers to have academic degrees and certification equivalent to that required of teachers.
3. Substitute teaching was a viable means to enter the teaching profession.
4. The majority of school systems, 74.6%, selected substitute teachers based on past performance.

5. The majority of school systems, 60.8%, did not formally evaluate substitute teacher performance.
6. Almost all districts used substitute teacher programs and maintained rosters to fulfill the district's needs.
7. An estimated 736,696 individuals comprised the national work force of substitute teachers.
8. Substitute teacher use on a typical day ranged from 10 to 30% of the available work force.
9. Substitute teacher orientation programs were provided by less than half the districts, 42.4%, and inservice programs were provided by less than a fourth of the districts, 22% (pp.VII-VIII).

There was evidence that the use of substitute teachers is on the rise. Reynolds and Garfield, (1971) reported that the Pittsburgh School System experienced a 40% increase in the use of substitute teachers between 1965 and 1970. This 40% increase equated to 35,000 teaching days. Elliott and Manlove (1977) found 86% of all the corporations reporting indicated steady increases over the last 5-year period, even though the overall number of teachers and students declined (p. 269). Pronin (1983) wrote "in a recent survey of 100 school districts nation-wide, 100 percent responded that they had an ongoing need for substitutes" (p. 65).

As the use of substitute teachers increases, the effects upon the educational system become more pronounced. Kraft (1980) believed that in excess of a quarter of a million individuals work each year as substitute teachers in the public schools. He equated this figure as "one substitute for every eight regular teachers" (p. 79). McIntire and Hughes (1982) contended that pupils are exposed to substitute teachers "84 days (nearly half a school year) during 12 years of schooling" (p. 702). Their figure of 84 days was based upon an average student's exposure to substitute teaching being established at seven days per year. Kraft (1980) confirmed the 7-day figure, while Freedman (1975) suggested 10 substitute teacher contact days per year.

Two studies added additional meaning to these data. Olson (1971) contended that the ineffectiveness of using substitute teachers amounted to a waste of pupil time. Harnischfeger and Wiley (1975) demonstrated that reductions in school time resulted in lower pupil achievement.

In addition to revealing an increased use of substitute teachers and providing evidence that substitute teacher programs had a detrimental effect upon the educational system, the descriptive data in the literature provided information about the economic cost involved with substitute teacher programs. Heckman (1981) found the percentage of district funds expended for substitute teachers varied from .25% in Texas to 2.76% in West Virginia. Stashower (1974) discovered the variance in the ratio of expenditures for substitute salaries ranging from 1.25% in Alabama to 2.23% in Glendale, California. Although the percentage figures appeared low, Porwoll (1977) placed a dollar figure for substitute teacher programs. He stated that the average cost to school systems for substitute teacher salaries in 1975-76 ranged from $8000 to $842,670. In 1973, the largest percentage and dollar cost were reported in a New York State Study (1974). This report indicated that New York City spent 9%, 71.5 million dollars, of its funds for substitute teachers. Currence (1985) provided more recent information, "this school year, the New York City Public Schools will spend 'roughly' $38 million to fill the 3,000 classrooms left each school day" (p. 20).

As the New York State Study (1974) and Currence (1985) indicated, the cost of substitute teacher programs can be staggering. Olson (1971) felt that the academic return for this financial investment was nonexistent. Further building upon this concept of the lack of value of the substitute teacher programs, the next section of the literature review deals with the inherent problems of substitute teacher programs.

Inherent Problems of Substitute Teacher Programs

Esposito (1975) implied that many of the individuals hired as substitute teachers do not have the personal or academic skills to succeed in the teaching profession. Kraft (1980) stated "in many cases, the substitute has had less training than the regular teacher" (p. 79). Porwoll (1977) supported this conviction when he found that 41.4% of the responding districts did not require substitute teachers to hold certification or the same academic degree as required of regular teachers. Kraft felt that "substitutes tend not to take their job seriously, and find little satisfaction in their work" (p. 79).

According to many of the authors, much of the situation referred to in the preceding paragraph was attributable to the system that hires substitute teachers. Esposito (1975) contended the low salary eliminates many academically qualified people. Kraft (1980) elaborated upon this point, "in 1953-54, substitute teachers received slightly more than one-half of the regular teacher's annual salary. The situation is not much better today" (p. 86). Kraft went on to say that a Boston substitute teacher who substitute taught every day would receive 61.7%

of a regular teacher's salary. The salary differential was even greater in light of Porwoll's (1977) finding an absence of differentiated salaries for experience and that 74.6% of the districts provided no fringe benefits. "In the 25.4 percent providing some benefits, Social Security (62.6 percent) and teacher retirement (52.8 percent) are provided most often" (Porwoll 1977, p. viii).

In addition to the difference in compensations, districts place a psychological burden upon substitute teachers. Rawson (1981) stated, "they [substitutes] are frequently treated as second class citizens" (p. 82). He further stated, "administrators expect the substitute teacher to play the role of babysitter, even though philosophically they consider the substitute to be a professional colleague" (p. 82). Drake (1981) summarized the substitute teacher dilemma: "substitutes are seldom given time to prepare, but they must attempt some kind of effective teaching despite the apathy--often hostility--of students, administrators, and other faculty members" (p. 75). See (1970) told of the alienation she experienced:

> for many a day, I'll remember one building when several teachers were chatting companionably in the hall as I entered but became silent as they watched me go toward the office. If they returned my "Good morning," I didn't hear it. (p. 58)

Kraft (1980) attributes high turnover among substitute teachers to the "lack of assistance from principals and regular teachers." He goes on to say that "frequent discipline problems give many substitutes a feeling of defeat and isolation" (p. 79).

The substitute teacher's psychological burden is compounded by unclear and conflicting role expectations. Rawson (1981) stated "administrators, classroom teachers, and the substitutes all have different and often conflicting role expectations regarding the substituting environment" (p. 82). He saw administrators, too busy to work with substitutes, expecting only that substitutes maintain order, follow policy, and minimize problems sent to the office (p. 82). Teachers expected someone who can teach with inadequate lesson plans while not creating busy work, keep the classroom in one piece, and remain a non-threat to the teacher's professional standing (p. 82). Substitutes perceived themselves based upon the expectations of administrators, the staff, and self-perceptions (p. 82). Rawson went on to say:

> The coolness with which substitute teachers are treated by regular staff members reinforces their perception of the low status and prestige their occupation is granted. This low prestige as well as the isolation and lack of positive feedback predictably account for low job satisfaction. (p.82)

Freedman (1975) added students to the list of those who eroded substitute teacher morale. Finally, Woods and Woods (1974) compared the absence of the classroom teacher as equivalent to "the effects of maternal separation on a child's emotional and cognitive development" (p. 162). They concluded that substitute teachers should learn to feel comfortable with their temporary status (p. 166).

The inherent problems of substitute teacher programs indicate a situation in which individuals are as Keller (1976) surmised, "many substitutes start out handicapped. They're unprepared and unprepared for" (p. 77). Some authors, as they provided solutions to these inherent problems, stated or implied that effective substitute teachers needed to possess certain characteristics. The third section of the literature review contains a synopsis of the literature regarding those characteristics which are also the variables under investigation.

Literature Related to the Variables Under Investigation

The staff of the Orange County Public Schools personnel department collects a variety of data which were deemed pertinent to making employment decisions regarding prospective employees. In the Statement of the Problem of this study these data were catagorized as belonging to one of four groups of variables: personal, educational, experiential, and appraisal. In the Definition of Terms section in this study, these variables were further delineated. The data collected about personal variables are more for the purpose of demographic classification rather than indicators of effectiveness of instructional employees. These personal variables consisted of age, sex, race, and marital status. However, there existed literature indicating that each of the other variables may be important regarding the effectiveness of substitute teachers.

This section of the review of literature concentrates on those variables which are non-demographic and may be related to the instructional effectiveness of substitute teachers. A numbered listing is provided for review and to enhance the reader's ability to identify the variables being discussed in this section of the literature review. The listing of variables which may be related to the instructional effectiveness of substitute teachers is as follows:

1. Enthusiasm for teaching
2. Adaptability new ideas
3. Ability to discipline
4. Planning and preparation
5. Initiative and creativity
6. Professional attitude

7. General rank as a teacher
8. Quality of work/work habits
9. Ability to work with others
10. Ability to learn
11. Dependability/attendance
12. Attitude
13. Judgment/common sense
14. Initiative
15. Health/emotional stability
16. Personality
17. Personal appearance
18. Non-teaching related experience
19. Teaching experience
20. Non-related work experience
21. Level of institutionalized education
22. Number of courses related to teacher education
23. Certification as a teacher

Drake (1981) stated or implied the presence of 22 of these 23 variables as characteristics of an effective substitute teacher. Since many of this author's statements related to more than one of the variables, each quotation cited below is augmented by a statement indicating the variables to which that quote refers. For ease of presentation and readibility, a quotation regarding a particular variable or variables will be followed by a statement that references each appropriate variable by using the number assigned that variable in the preceding paragraph. Drake's statements regarding the variables under investigation were as follows:

1. "a substitute teacher would be defined as a certified and qualified professional who replaces the regular classroom teacher for the purpose of continuing the instructional program, maintaining discipline and generally promoting the educational welfare of the students" (p.75). The related variables under investigation are 3, 7, 19, and 23.
2. "the substitute assignment may involve a new school, new colleagues, strange rules, and an unfamiliar curriculum--as well as a group of students whose background, subject knowledge, and needs are usually less than obvious" (p. 75). The related variable under investigation is 5.
3. "but they [substitutes] must attempt some kind of effective teaching" (p. 75). The related variables under investigation are 6 and 7.
4. "districts [can] impose additional conditions (e.g., interviews, classroom observations, in-service workshop requirements), that will insure a cadre of qualifying substitutes" (p. 76). The related variable under investigation is 18.
5. "one of the most important guidelines is the reminder that a principal should always ask for substitutes who can teach" (p. 76). The related variables under investigation are 17, 19, and 22.
6. "a person who can easily adapt to both old, new, self-contained and open classrooms" (p. 77). The related variable under investigation is 2.
7. "achieve rapport with all types of student groups" (p. 77). The related variable under investigation is 16.

8. "substitute [is] willing to work with, rather than against, students to achieve a respectable classroom environment" (p. 77). The related variables under investigation are 3 and 16.
9. "the substitute [has] an adequate knowledge of his or her subject field. . .[and] has the skills to create an effective lesson" (p. 77). The related variables under investigation are 4, 10, 19, 21, and 22.
10. "the substitute [is] a congenial, likable person" (p. 77). The related variable under investigation is 16.
11. "substitutes should be assigned only to the department or departments in which they have certification and expertise" (p. 77). The related variables under investigation are 21, 22, and 23.
12. "arouse pupil interest and enthusiasm" (p. 78). The related variable under investigation is 1.
13. "demonstrate a knowledge of the subject matter being taught" (p.78). The related variables under investigation are 1, 6, and 7.
14. "recognize and attempt to provide for varied student abilities with the limits of the classroom situation" (p. 78). The related variables under investigation are 2 and 14.
15. "allow students the opportunity of appropriate independent and small group participation" (p. 78). The related variables under investigation are 1 and 7.
16. "stimulate creative and original thought" (p. 78). The related variables under investigation are 1, 6, and 9.

17. "provide appropriate reinforcement for positive student behavior . . . [and] set ground rules that are firm but practical enough to permit reasonable creative expression" (p. 78). The related variable under investigation is 3.
18. "encourage discussion, questioning and inquiry" (p. 78). The related variables under investigation are 1, 5, 6, and 7.
19. "encourage students to inject ideas and assume responsibilities" (p. 78). The related variables under investigation are 6 and 7.
20. "respect the personal worth of each student" (p. 78). The related variable under investigation is 9.
21. "adhere to established school policies and procedures" (p. 78). The related variables under investigation are 13, 18, and 20.
22. "enjoy the challenge of varied teaching assignments" (p. 78). The related variable under investigation is 2.
23. "set the task of helping students recognize for themselves their academic successes and special problem areas as an important professional goal" (p. 78). The related variables under investigation are 1, 6, and 7.
24. "respond favorably to supervision and suggestions for improvement" (p. 78). The related variables under investigation are 6, 9, 10, 12, and 20.
25. "be both enthusiastic and understanding" (p. 78). The related variables under investigation are 1 and 6.
26. "possess the judgment a teacher must have to handle both emergencies and disruptive behavior" (p. 78). The related variables under investigation are 1, 3, and 13.

27. "respects confidences" (p. 78). The related variable under investigation is 6.
28. "handle routine efficiently" (p. 78). The related variables under investigation are 8, 18, 19, and 20.
29. "maintain a friendly and positive public relations posture" (p. 78). The related variables under investigation are 8 and 20.
30. "be dependable and punctual" (p. 78). The related variable under investigation is 11.
31. "maintain poise and self-control" (p. 78). The related variable under investigation is 6.
32. "be patient and tactful" (p. 78). The related variable under investigation is 9.

Pronin (1983) supported Drake's (1981) contention regarding 12 of the 23 variable factors under investigation. For ease of presentation and readability, Pronin's quotations are presented in the same format as were Drake's quotations. Pronin's statements regarding the variable factors under investigation are as follows:

1. "as a sub, you must take on the regular teacher's responsibility for moving academic learning forward" (p.65). The related variables under investigation are 1 and 7.
2. "you must use whatever materials are at hand and supplement them with innovative, educational, and fun activities of your own" (p. 65). The related variables under investigation are 1, 6, 7, and 14.
3. "you must do it [teach] in a setting that is casual but correct, friendly but authoritative, and often entirely new to

you" (p. 65). The related variables under investigation are 3, 5, and 14.

4. "a sub teaches. And improvises. And enriches" (p. 65). The related variables under investigation are 1, 5, 6, 7, and 14.
5. "meeting new people daily and . . . sharing in the joy of a child's new discoveries and useful energy" (p. 65). The related variables under investigation are 6, 9, 12, and 16.
6. "[substitutes] are prepared, confident, and willing to give of themselves" (p. 65). The related variables under investigation are 4, 8, and 9.
7. "take a positive attitude, a firm step, and a big smile with you as you stride to the head of the class [with a] cheery, 'good morning!" (p. 66). The related variables under investigation are 12 and 16.
8. "size up today's class" (p. 66). The related variables under investigation are 4 and 13.
9. "establish two-way communication" (p. 66). The related variables under investigation are 6, 7, and 8.
10. "use . . . positive reinforcement" (p. 66). The related variable under investigation is 6.
11. "establish your expectations as far as discipline . . . [and] be prepared to handle a variety of discipline problems" (p. 66). The related variables under investigation are 3 and 5.
12. "for the sub, each day is a new adventure and each classroom a whole new world" (p. 68). The related variable under investigation is 2.

In addition to Drake (1981) and Pronin (1983), the following authors mentioned characteristics which they considered salient to effective substitute teachers:

1. Garwood (1976) stated that substitute teachers should "dress appropriately . . . be an early bird . . . [and] be prepared" (p. 75). The related variables under investigation are 4, 11, and 17.
2. Leal (1969) felt a substitute teacher needed versatility, a sense of humor, and the ability to maintain discipline (p. 106). The related variables under investigation are 2, 3, and 16.
3. Freedman (1975) expressed that an effective substitute teacher should be capable of utilizing personal knowledge and skills to create meaningful teaching activities. The related variables under investigation are 18, 19, 20, and 21.
4. Esposito (1975) implied that substitute teachers should be adequately trained in educational techniques and academically qualified (p. 48). The related variables under investigation are 10, 19, 21, and 22.
5. Jentzen and Vockell (1978) stated, "the self perceptions and role perceptions of substitute teachers can be important factors in their effectiveness" (p. 86). The related variable under investigation is 15.
6. Woods and Woods (1974) wrote that, "substitutes who are clear about their professional role are likely to be more self-confident and are likely to perform their duties more competently" (p. 167). The related variables under investigation are 6 and 15.

7. Kraft (1980) felt that substitute teachers should be certified teachers and familiar with the system's rules and regulations (p. 81). The related variables under investigation are 18 and 23.

Eleven authors were cited regarding their statements on background variables which they deemed pertinent to effective substitute teaching. Some of these background variables were examined as possible predictors of effective regular teachers. The final section of literature review summarizes the research on background variables that have been studied as possible predictors of successful regular teachers.

Background Variables Related to Regular Teacher Selection

The research on background variables related to regular teacher selection concentrated on socio-economic factors, intelligence/ academic ability, personal traits, experience with children, pedagogic knowledge, pedagogic skills, certification, and years of teaching experience. The research on these variables has been mostly correlational studies comparing an independent variable with one of two measures of teacher effectiveness, supervisor's ratings or pupil achievement. The focus of this remaining section of literature review is on those studies which Turner (1975) called selection--work success studies.

Schalock (1979) found few studies examining the existence of common socio-ecomonic variables among individuals who became teachers. The research contained data indicating a disproportionate number of individuals entered teaching from the lower and middle socio-economic groups. Furthermore, the degree of disproportionality was greater for men than women. Schalock also found that women teachers out numbered men teachers two to one although an increasing number of men were becoming teachers. In light of his limited findings, Schalock concluded "teachers as an occupational choice is a neglected aspect of research on teacher selection, and needs to be pursued" (p. 367). Shields and Daniele (1980) concurred "for future research it would be valuable to identify combinations of presage variables, such as race, verbal ability, and certain personality traits, that can be specifically related to measureable behavior patterns of teachers in the classrooms" (p. 1916).

Since the act of teaching requires a transfer of knowledge, there exists a logical presumption that teachers must have the ability to comprehend knowledge and to help others comprehend knowlege (Schalock, 1979). This presumption was supported in the research regarding admission criteria of teacher education programs. Most often grade point averages, scholastic aptitude tests, and measures in writing and speaking skills were used as criteria to select candidates for teacher education programs (Schalock, 1979). Although, Levin (1968) linked teacher verbal scores on standard tests to student achievement, Vernon (1965) stated that teachers were too intellectually homogeneous to establish a relationship between intelligence and performance. Shields and Daniele (1980) also reported that research linking measures of intellectual ability to effective teaching performance was inconclusive.

Schalock (1979) reported the research on personal traits such as "attitude, interest, flexibility, or ability to relate to others, . . . warmth, sensitivity, and tough mindedness," contained little evidence that personal traits were accurate predictors of effective teachers (p. 371). The trait of flexibility appeared to be an exception to this data. Turner (1963) found that first year teachers with low problem solving skills were more likely to leave teaching than were first year teachers with high problem solving skills. Hunt and Joyce (1967) reported that teachers who exhibited a wider range of teaching styles were judged more effective. Ryans (1960) stated that teacher behaviors of originality and stimulation related to pupil behaviors of alertness and participation. Bond (1959) reported student teachers rated highly creative before they student taught were rated outstanding as student teachers. Crocker (1974) found that flexibility was a stronger predictor of effective student teacher performance than were measures of intelligence or interviews. Schalock summarized personal trait research when he concluded that the "results of research on the concept of flexibility or adaptability are at least consistent. The concept has the added advantage of including within it an estimate of the responsiveness of teachers to the different demands of instructional settings" (p. 373).

Schalock (1979) reported contradictory research regarding experience with children as a predictor of an effective teacher. Individuals who had engaged in reading to children, looking after a teacher's class, and playing school were more stimulating and democratic in their classroom procedures. Furthermore, these individuals had more favorable attitudes towards pupils (Ryans, 1958, 1960). Gengler's paper (cited in Schalock) on three replication studies performed at the Oregon College of Education contained contradictory evidence regarding a relationship between effective teachers and work experience with children. Although logic might lead to concurrence with Ryans (1958, 1960) findings, the results of the three studies conducted at the Oregon College of Education cannot be set aside.

The research regarding pedagogic knowledge and skills as predictors of effective teachers was inconclusive with one exception, time on-task (Rosenshire & Berliner, 1978). There may be a presumed relationship between time on-task and the ability to implement conceived plans; however the literature contained no data to support such a logical connection. Schalock (1979) concluded "while knowledge of content to be taught and knowledge of methods used in teaching content to others obviously are necessary for success in teaching, it appears that knowledge alone is not sufficient to assure success" (p. 376). He went on to state "knowledge of either content or method will never be sufficient as a predictor of teaching success, and decisions about teacher selection should depend on variables more closely related to actual performance in teacher settings" such as competency-based teaching (p. 376). However, Schalock admitted that existing data did not support training in competency-based teaching preparation programs as a predictor of effective teaching. Competency-based skills taught in micro-teaching situations do not carry over into the classroom after training has ceased (Copeland, 1975; Copeland & Doyle, 1973). Bloom (1976) further negated the effects of teaching skills when he found that 75% to 80% of the variance in student achievement could be attributed to factors other than instruction.

The research on certification and years of teaching experience provided more consistent results regarding predicting effective teachers than did the research previously reviewed. LuPone (1961) found that certified teachers were more effective than provisionally certified teachers. Hall (1964) reported similar results with regard to language skill development when the certified teachers were compared to teachers who had not completed the certification requirements. Levine (1968) and Morgan (1979) concluded from their studies that the number of years of experience was an important factor related to student achievement. Coleman (1966) also found that verbal ability followed by years of experience had the strongest relationship to pupil achievement.

The Literature in Brief

Overall, the research on background characteristics of effective substitute teachers was inconsistent and inconclusive. There existed in the research an indication that teacher flexibility, teacher verbal scores on standardized tests, time on-task, the existence of teacher certification, and years of experience may be related to teacher effectiveness as measured by pupil achievement (Coleman, 1966; Hall, 1964; Morgan, 1979; Levine, 1968; LuPone, 1961). Regarding the other background variables examined in this section of literature review no clear relationships were established between pupil achievement and the background variables reviewed.

Obviously, there exists a scarcity of literature regarding substitute teachers and this scarcity of related literature has continued into the most recent years, 1980 to 1985. However, the existing literature does contain three common themes which are germane to this study. First, there is an increasing need for effective substitute teachers. Second, substitute teacher programs contain some inherent problems. One of these inherent problems may be attributed to background variables regarding individuals being employed as substitute teachers. Third, there are certain background variables which individuals can possess to increase their effectiveness as substitute teachers. Furthermore, the literature on background variables of regular teachers supported the importance of the following variables as measures of effective teaching: teacher flexibility, teacher verbal ability, time on-task (planning and implementation), teacher certification, and years of experience. With the exception of teacher verbal ability, those variables deemed important to effective regular teaching were investigated in this study as being related to effective substitute teaching.

CHAPTER III

PRESENTATION OF DATA

As stated in Chapter I, the primary problem of this study was to determine the extent to which selected variables differentiate among more effective, moderately effective, and less effective substitute teachers in a single urban school district. The variables investigated were based on the data available to the district at the time of the initial employment of prospective substitute teachers. The variables studied were grouped into one of four categories as follows:

Personal variables. Age--In years as of the individual's last birthday; sex--female or male; race--white, black, Hispanic, or other; and marital status--married or not married.

Education variables. High school graduate, college work without obtaining a degree, bachelor's degree, postbachelor's course work, or postbachelor's degree; teacher education courses--no or yes; and regular teacher certification--no or yes.

Experiential variables. Non-related work experience, non-teaching related experience, or teaching experience.

Appraisal variables. Instructional qualities--enthusiasm for teaching, adaptability to new ideas, ability to discipline, planning and preparation, initiative and creativity, professional attitude, and general rank as a teacher; and professional/personal qualities--work/work habits, ability to work with others, ability to learn, dependability/attendance, attitude, judgment/common sense, initiative, health/emotional stability, personality and personal appearance.

Regarding these variables, the researcher sought the answers to four questions:

1. What are the personal, educational, experiential, and appraisal variables of individuals rated as more effective substitute teachers?
2. What are the personal, educational, experiential, and appraisal variables of individuals rated as moderately effective substitute teachers?
3. What are the personal, educational, experiential, and appraisal variables of individuals rated as less effective substitute teachers?
4. What is the extent to which the personal, educational, experiential, and appraisal variables of substitute teachers discriminate among more effective substitute teachers, moderately effective substitute teachers, and less effective substitute teachers?

The researcher used data about 206 individuals, Orange County Public Schools substitute teachers, whom building administrators had rated into one of three categories--more effective, moderately effective, or less effective. The 206 individuals were categorized as follows: more effective--75, moderately effective--75, and less effective--56. Initially, the researcher began the study with a pool of 427 individuals who had taught in three or more schools and who had taught for 10 or more days. Of these 427 individuals, 221 were eliminated from the sample. The pool was reduced by 74 individuals due to their receiving unclassifiable ratings from building administrators. Of these 74 individuals, 38 received ratings from two or fewer building administrators whereas three building administrator ratings were required. Another 36 individuals received unclassifiable ratings, 22 individuals received two more effective ratings with one less effective rating and 14 individuals received one more effective rating with two less effective ratings. (As noted in Table I, Chapter I, these were not acceptable ratings.)

The substitute teacher pool was reduced by 123 individuals due to possible skewed ratings. The researcher was concerned that substitute teachers who taught in the same situation for three or more consecutive days might be rated as more effective through familiarity with the situation. The decision to eliminate 123 individuals from the sample was based upon data collected during the months of October, January, and March of the 1984-85 school year. During those three months there were 1,189 substitute teaching assignments for a total of 7,738 teaching days. Substitute teachers who taught in the same situation for three or more consecutive days numbered 123 and accounted for 290 teaching assignments. Substitute teachers who taught two or fewer days in the same situation numbered 304 and accounted for 899 teaching assignments. If the 123 substitute teachers who taught in the same situation for three or more consecutive teaching days were mutually exclusive of the substitute teachers who taught in the same situation for two or fewer consecutive days, individuals who may have been rated as more effective due to the individual's familiarity with the situation would have had 28.81% probability of inclusion into the original sample of 427.

The sample was further reduced by 24 individuals due to the study design which was written to include 75 individuals in each of the three study groups. Thus, the last 18 individuals rated as more effective substitute teachers and the last 6 rated as moderately effective substitute teachers were eliminated from the sample. Since the size of the original pool of 427 individuals could not be expanded and only 56 individuals were rated as less effective substitute teachers, the usable sample consisted of 75 individuals rated as more effective substitute teachers, 75 individuals rated as moderately effective substitute teachers, and 56 individuals rated as less effective substitute teachers.

The remainder of this chapter is divided into three sections. The first section, entitled Descriptive Data, is devoted to providing the data in a narrative and a tabular format with regard to the following three questions:

1. What are the personal, educational, experiential, and appraisal variables of individuals rated as more effective substitute teachers?
2. What are the personal, educational, experiential, and appraisal variables of individuals rated as moderately effective substitute teachers?
3. What are the personal, educational, experiential, and appraisal variables of individuals rated as less effective substitute teachers?

The second section of this chapter, entitled Discriminant Function Analysis Data, is devoted to providing the data in a narrative and a tabular format with regard to answering the fourth question that provided direction for the study:

4. What is the extent to which the personal, educational, experiential, and appraisal variables of substitute teachers discriminate among more effective substitute teachers, moderately effective substitute teachers, and less effective substitute teachers?

The third section of this chapter, entitled Interpretation of the Discriminant Function Data, is devoted to providing a narrative with regard to data interpretation.

Descriptive Data

In this section the data are crosstabulated with regard to the total sample group and each of the three constituent groups: more effective substitute teachers, moderately effective substitute teachers, and less effective substitute teachers. The descriptive data regarding these groups are presented according to each variable under investigation. Those variables were as follows: age, sex, race, marital status, level of education, teacher education courses, regular teacher certification, experience, and appraisal.

Age

The variable of age was determined as of the individual's last birthday. Substitute teachers rated as more effective had a mean age of 35.51 with a standard deviation of 13.23 and a range of 21-72. Substitute teachers rated as moderately effective had a mean age of 40.03 with a standard deviation of 14.15 and a range of 22-75. Substitute teachers rated as less effective had a mean age of 37.57 with a standard deviation of 11.67 and a range of 20-68. The total substitute teacher sample had a mean age of 37.71 with a standard deviation of 13.22 and range of 20-75. (Table 2 contains the summary data on age.)

Table 2

Mean, Standard Deviation, and Range for Age of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Substitute Group	N	Mean	Standard deviation	Range
More Effective	75	35.51	13.23	21-72
Moderately Effective	75	40.03	14.15	22-75
Less Effective	56	37.57	11.67	20-68
Total	206	37.71	13.22	20-75

Sex

As shown in Table 3, the substitute teacher group rated as more effective consisted of 59 (28.64%) females and 16 (7.77%) males. The substitute teacher group rated as moderately effective consisted of 53 (25.73%) females and 22 (10.68%) males. The substitute teacher group rated as less effective consisted of 34 (16.50%) females and 22 (10.68%) males. The total substitute teacher sample consisted of 146 (70.87%) females and 60 (29.13%) males.

Table 3

Sex of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Substitute Group	N	Female		Male	
		N	%	N	%
More Effective	75	59	28.64	16	7.77
Moderately Effective	75	53	25.73	22	10.68
Less Effective	56	34	16.50	22	10.68
Total	206	146	70.87	60	29.13

Race

The substitute teacher group rated as more effective consisted of 65 (31.55%) whites, 8 (3.88%) blacks, and 2 (0.97%) Hispanics. The substitute teacher group rated as moderately effective consisted of 62 (30.10%) whites, 11 (5.34%) blacks, 1 (0.49%) Hispanic, and 1 (0.49%) other. The substitute teacher group rated as less effective consisted of 40 (19.42%) whites, 13 (6.31%) blacks, and 3 (1.46%) Hispanics. The total substitute teacher sample consisted of 167 (81.07%) whites, 32 (15.53%) blacks, 6 (2.91%) Hispanics, and 1 (0.49%) other (see Table 4).

Table 4

Race of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Substitute Group	N	White		Black		Hispanic		Other	
		N	%	N	%	N	%	N	%
More Effective	75	65	31.55	8	3.88	2	0.97	0	0.00
Moderately Effective	75	62	30.10	11	5.34	1	0.49	1	0.49
Less Effective	56	40	19.42	13	6.31	3	1.46	0	0.00
Total	206	167	81.07	32	15.53	6	2.91	1	0.49

Marital Status

As can be seen in Table 5, the substitute teacher group rated as more effective consisted of 37 (17.97%) married individuals and 38 (18.45%) not married individuals. The substitute teacher group rated as moderately effective consisted of 35 (16.99%) married individuals and 40 (19.42%) not married individuals. The substitute teacher group rated less effective consisted of 29 (14.08%) married individuals and 27 (13.10%) not married individuals. The total substitute teacher sample consisted of 101 (49.03%) married individuals and 105 (50.97%) not married individuals.

Table 5

Marital Status of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Substitute Group	N	Married N	Married %	Not Married N	Not Married %
More Effective	75	37	17.96	38	18.45
Moderately Effective	75	35	16.99	40	19.42
Less Effective	56	29	14.08	27	13.10
Total	206	101	49.03	105	50.97

Level of Education

The level of education variable was the individual's highest completed level of formalized instruction. The substitute teacher group rated as more effective consisted of 6 (2.91%) individuals who had completed high school, 9 (4.37%) individuals who had completed college level courses without obtaining a degree, 40 (19.42%) individuals who had completed a bachelor's degree, 10 (4.85%) individuals who had completed some college courses beyond the bachelor's degree, and 10 (4.85%) individuals who had completed a postbachelor's degree. The substitute teacher group rated as moderately effective consisted of 14 (6.80%) individuals who had completed high school, 9 (4.37%) individuals who had completed college level courses without obtaining a degree, 43 (20.87%) individuals who had completed a bachelor's degree, 2 (0.97%) individuals who had completed some college courses beyond the bachelor's degree, and 7 (3.40%) individuals who had completed a postbachelor's degree. The substitute teacher group rated as less effective consisted of 9 (4.37%) individuals who had completed high school, 10 (4.85%) individuals who had completed college level courses without obtaining a degree, 24 (11.65%) individuals who had completed a bachelor's degree, 2 (0.97%) individuals who had completed some college courses beyond the bachelor's degree, and 11 (5.34%) individuals who had completed a postbachelor's degree. The total substitute teacher sample consisted of 29 (14.08%) individuals who had completed high school, 28 (13.59%) individuals who had completed college level courses without obtaining a degree, 107 (51.94%) individuals who had completed a bachelor's degree, 14 (6.80%) individuals who had completed some college courses beyond the bachelor's degree, and 28 (13.59%) individuals who had completed a postbachelor's degree. Table 6 contains the summary data on level of education.

Table 6

Level of Education of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Substitute Group	N	High School		College Courses Without Degree		Bachelor's Degree		Post-Bachelor's Courses		Post-Bachelor's Degree	
		N	%	N	%	N	%	N	%	N	%
More Effective	75	6	2.91	9	4.37	40	19.42	10	4.85	10	4.85
Moderately Effective	75	14	6.80	9	4.37	43	20.87	2	0.97	7	3.40
Less Effective	56	9	4.37	10	4.85	24	11.65	2	0.97	11	5.34
Total	206	29	14.08	28	13.59	107	51.94	14	6.80	28	13.59

Teacher Education Courses

The substitute teacher group rated more effective contained 22 (10.68%) individuals who lacked documentation of completing any teacher education courses and 53 (25.73%) individuals whose personnel records contained evidence of pedagogical courses (see Table 7). The substitute teacher group rated as moderately effective contained 38 (18.45%) individuals who lacked documentation of completing any teacher education courses and 37 (17.96%) individuals whose personnel records contained evidence of pedogogical courses. The substitute teacher group rated less effective contained 31 (15.05%) individuals who had no documented teacher education courses and 25 (12.14%) individuals whose personnel records contained such evidence of pedogogical courses. The total substitute teacher sample contained 91 (44.17%) individuals who lacked documentation of completing any teacher education courses and 115 (55.83%) individuals whose personnel records had evidence of pedogogical courses.

Table 7

Teacher Education Courses of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

		No Teacher Education Courses		Teacher Education Courses	
Substitute Group	N	N	%	N	%
More Effective	75	22	10.68	53	25.73
Moderately Effective	75	38	18.45	37	17.96
Less Effective	56	31	15.05	25	12.14
Total	206	91	44.17	115	55.83

Regular Teacher Certification

The regular teacher certification variable was whether or not the individual had been granted a regular Florida teaching certificate and, therefore, had the credentials to secure a contractual teaching position in the state of Florida. The substitute teacher group rated as more effective consisted of 38 (18.45%) individuals who were not certified and 37 (17.96%) individuals who were certified as regular teachers in the state of Florida. The substitute teacher group rated as moderately effective consisted of 49 (23.79%) individuals who were not certified and 26 (12.62%) individuals who were certified. The substitute teacher group rated as less effective consisted of 37 (17.96%) individuals who were not certified and 19 (9.22%) individuals who were certified as regular teachers in the state of Florida. The total substitute teacher sample consisted of 124 (60.19%) individuals who were not certified and 82 (39.81%) individuals who were certified as regular teachers in the state of Florida. Table 8 contains the summary data about certification.

Table 8

Regular Teacher Certification Status of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Substitute Group	N	Not Certified		Certified	
		N	%	N	%
More Effective	75	38	18.45	37	17.96
Moderately Effective	75	49	23.79	26	12.62
Less Effective	56	37	17.96	19	9.22
Total	206	124	60.19	82	39.81

Work Experience

Table 9 shows the types of work experiences of the substitute teachers at the time of employment. (For purposes of analysis an individual with regular teacher experience was assigned the highest value, 2, regardless of other work experiences. Individuals with non-teaching related experiences, who had not taught in a regular teaching situation but had worked with school-age children or in a school setting, were assigned a value of 1. All other individuals were classified as having non-related work experience and were assigned a value of 0.) The substitute teacher group rated as more effective consisted of 30 (14.56%) individuals with teaching experience, 20 (9.71%) individuals with non-teaching related experience, and 25 (12.14%) individuals with non-related work experience. The substitute teacher group rated as moderately effective consisted of 22 (10.68%) individuals with teaching experience, 19 (9.22%) individuals with non-teaching related experience, and 34 (16.50%) individuals with non-related work experience. The substitute teacher group rated as less effective consisted of 20 (9.71%) individuals with teaching experience, 8 (3.88%) individuals with non-teaching related experience, and 28 (13.59%) individuals with non-related work experience. The total substitute teacher sample consisted of 72 (34.95%) individuals with teaching experience, 47 (22.82%) individuals with non-teaching related experiences, and 87 (42.23%) individuals with non-related work experience.

Table 9

Work Experience of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Substitute Group	N	Teaching Experience N	Teaching Experience %	Non-teaching Related Experience N	Non-teaching Related Experience %	Non-related Work Experience N	Non-related Work Experience %
More Effective	75	30	14.56	20	9.71	25	12.14
Moderately Effective	75	22	10.68	19	9.22	34	16.50
Less Effective	56	20	9.71	8	3.88	28	13.59
Total	206	72	34.95	47	22.82	87	42.23

Appraisal

The appraisal variables consisted of instructional qualities and professional/personal qualities. There were seven instructional qualities: enthusiasm for teaching, adaptability to new ideas, ability to discipline, planning and preparation, initiative and creativity, professional attitude, and general rank as a teacher. There were 10 professional/personal qualities: work/work habits, ability to work with others, ability to learn, dependability/attendance, attitude, judgment/common sense, initiative, health/emotional stability, personality, and personal appearance. For analysis the researcher averaged the ratings that each individual had received from four independent raters. This process resulted in a total of 17 averages for each individual which represented each individual's appraisal score. The substitute teacher group rated as more effective had a mean appraisal variable score of 70.02 with a standard deviation of 7.96 and a range of 50.75-83.00. The substitute teacher group rated as moderately effective had a mean appraisal variable score of 69.25 with a standard deviation of 8.01 and a range of 46.50-81.75. The substitute teacher group rated as less effective had a mean appraisal variable score of 66.75 with a standard deviation of 6.97 and a range of 48.50-80.00. The total substitute teacher sample had a mean appraisal variable score of 68.85 with a standard deviation of 7.80 and a range of 46.50-83.00. (Table 10 contains the summary data.)

Table 10

Mean, Standard Deviation, and Range for Appraisal Variables of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Substitute Group	N	Mean	Standard Deviation	Range
More Effective	75	70.02	7.96	50.75-83.00
Moderately Effective	75	69.25	8.01	46.50-81.75
Less Effective	56	66.75	6.97	48.50-80.00
Total	206	68.85	7.80	46.50-83.00

Discriminant Functional Analysis Data

The subprogram, Discriminant, of the Statistical Package for the Social Sciences (SPSS), was used to analyze the data in regard to the fourth question: What is the extent to which the personnel, educational, experiential, and appraisal variables of substitute teachers discriminate among more effective substitute teachers, moderately effective substitute teachers, and less effective substitute teachers? The output from the data processed through the subprogram Discriminant resulted in the following: two discriminant functions, two sets of discriminant function coefficients, within-groups canonical correlations between the discriminant functions and the discriminating variables, group centroids, an individual's actual group classification in relation to that individual's predicted (probable) group classification, summative classification results, and a Pearson correlation matrix for the variables. The remainder of this section consists of a narrative and tabular presentation of the data regarding each of the aforementioned statistical analyses.

Discriminant Functions

Discriminant analysis consists of establishing linear combinations of variables for the purpose of discriminating among predefined groups. Since there were three groups of substitute teachers in this study and no one discriminant function accounted for all of the variance among the groups, the discriminant analysis resulted in two discriminant functions. (The reader is reminded that the maximum number of discriminant functions produced in a discriminant analysis is one less than the number of groups being studied.) Table 11 contains these two discriminant functions and other statistical data relevant to the interpretation of those functions. The eigenvalue is a measure of each function's relative importance with regard to the total variance associated with the discriminant functions. In function 1, the eigenvalue of .1105 indicated that function 1 accounted for 63.40% of the variance. In function 2, the eigenvalue of .0638 indicated that function 2 accounted for 36.60% of the variance. The canonical correlations indicated the maximum coefficient of multiple correlation between the functions and the group variables. The canonical correlations, as measures of the functions' discrimination powers, were .3154 for function 1 and .2448 for function 2. Another method of determining statistical significance for the discriminant analysis process was to compute a Wilks' lambda for each function and transform each lambda into a chi-square statistic. Function 1 had a Wilks' lambda of .8465 which with 18 degrees of freedom had a computed chi-square of 33.15 and a significance of 0.0160. Function 2 had a Wilks' lambda of 0.9400 which with eight degrees of freedom had a computed chi-square of 12.30 and a significance of 0.1383.

Table 11

Discriminant Functions for Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Function	Eigen-Value	Percent Variance	Canonical Correlation	Wilks' Lambda	Chi-Square	DF	Significance
1	0.1105	63.40	0.3154	0.8465	33.15	18	0.0160
2	0.0638	36.60	0.2448	0.9400	12.30	8	0.1383

Discriminant Function Coefficients

Each discriminant function contained a coefficient for each variable which has been included as part of input data in the discriminant analysis process. These discriminant function coefficients were used to compute each individual's discriminant score. A particular individual's discriminant score was derived by summing the products which resulted from multiplying each discriminating variable by its respective coefficient. In addition to being used to compute each individual's discriminant score, each discriminant function coefficient represented the relative contribution of its corresponding variable to the discriminant function. Since coding of the variables can affect a coefficient's sign, the relative values of the discriminant function coefficients were analyzed without regard to the coefficient signs. The descending relative absolute values of the variables in function 1 were as follows: teacher education courses (-0.6875), age (0.4983), sex (0.4347), race (0.2763), level of education (-0.1630), appraisal (-0.1468), marital status (0.0709), work experience (0.0677), and regular teacher certification (0.0542). The descending relative absolute values of the variables in function 2 were as follows: level of education (-0.7187), appraisal (0.7033), age (0.6537), marital status (0.3590), race (-0.3199), work experience (-0.2198), teacher education courses (0.1929), sex (-0.0454), and regular teacher certification (0.0210). Table 12 contains the summary data on the discriminant function coefficients.

Table 12

Discriminant Function Coefficients of the Variables Investigated to Discriminate Among Substitute Teachers Rated as More Effective, Moderately Effective and Less Effective

Variable	Function 1	 2
Age	0.4983	0.6537
Race	0.2763	-0.3199
Sex	0.4347	-0.0454
Marital Status	0.0709	0.3590
Level of education	-0.1630	-0.7187
Teacher education courses	-0.6875	0.1929
Regular teacher certification	0.0542	0.0210
Work experience	0.0677	-0.2198
Appraisal	-0.1468	0.7033

Wilks' Lambda

Wilks' lambdas were computed to determine the probability that the degree of discrimination computed for each variable would be attributed purely to sampling if no group differences existed in the population. Wilks' lambdas and their level of significance for each of the variables were as follows: age (0.9787, p=0.112), sex (0.9757, p=0.082), race (0.9838, p=0.191), marital status (0.9984, p=0.845), level of education (0.9777, p=0.101), teacher education courses (0.9475, p=0.004), regular teacher certification (0.9783, p=0.108), work experience (0.9854, p=0.225) and appraisal (0.9710, p=0.051). Table 13 contains the summary data on the Wilks' lambdas.

Table 13

Wilks' Lambdas of the Variables Investigated to Discriminate Among Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Variable	Wilks' Lambda	F	Significance	DF
Age	0.9787	2.21	0.112	
Sex	0.9757	2.53	0.082	
Race	0.9838	1.67	0.191	
Marital status	0.9984	0.17	0.845	
Level of Education	0.9777	2.32	0.101	
Teacher education courses	0.9475	5.63	0.004	
Regular teacher certification	0.9783	2.25	0.108	
Work experience	0.9854	1.50	0.225	
Appraisal	0.9710	3.03	0.051	
				2, 203

Pooled Within-groups Canonical Correlations Between Discriminant Functions and Discriminating Variables

The canonical correlation procedure was used to establish an index of the relationship between two sets of discriminating variables and the discriminant function. A set of weights was computed for each of the two sets of variables so that the weighted sums of the two variable sets were correlated as highly as possible. Once the two groups which correlated the highest were established, a correlation with the function was computed for the variable that accounted for the greatest amount of variance within the function. Once computed, the variable that accounted for the greatest amount of the variance was eliminated from subsequent calculations and a correlation with the function was computed for the variable that accounted for the second greatest amount of variance within the function. This procedure was continued in a like manner until a correlation had been computed for each discriminating variable for the two discriminant functions. Evaluation of the relative value of each correlation was considered in terms of absolute value within the variable set. Evaluation by absolute value was appropriate since the sign of each correlation was dependent upon variable coding. For function 1 the two sets of variables were as follows: set 1--teacher education courses (-0.7084), regular teacher certificate (-0.4444), sex (0.4350), work experience (-0.3558), and race (0.3097); set 2--appraisal (-0.4088), level of education (-0.3545), age (0.3397), and marital status (-0.0074). For function 2 the two sets of variables were as follows: set 1--appraisal (0.4225), age (0.3763), level of education (-0.3749), and marital status (0.1609); set 2--race (-0.3027), sex (-0.2512), work experience (-0.1136), regular teacher certification (-0.0786), and teacher education courses (-0.0099). Table 14 contains the summary data on the pooled within-groups canonical correlations between the discriminant functions and discriminating variables.

Table 14

Pooled Within-groups Canonical Correlations Between the Discriminant Functions and Discriminating Variables Regarding Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Variables by Set	Function 1	 2
Set 1		
Teacher education courses	-0.7084	-0.0099
Regular teacher certification	-0.4444	-0.0786
Sex	0.4350	-0.2512
Work experience	-0.3558	-0.1136
Race	0.3097	-0.3027
Set 2		
Appraisal	-0.4088	0.4225
Age	0.3397	0.3763
Level of education	-0.3545	-0.3749
Marital Status	0.0074	0.1609

Group centroids

Centroids, the central tendency measurement that results from discriminant functional analysis, were computed by averaging the discriminant scores for the individuals within a particular group. Substitute teachers rated more effective had a function 1 centroid of -0.4295 and a function 2 centroid of -0.0573. Substitute teachers rated moderately effective had a function 1 centroid of 0.1840 and a function 2 centroid of 0.3003. Substitute teacher rated less effective had a function 1 centroid of 0.3287 and a function 2 centroid of -0.3255. Table 15 contains the summary data on group centroids.

Table 15

Group Centroids for Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Substitute Group	Function 1	Function 2
More effective	-0.4295	-0.0573
Moderately effective	0.1840	0.3003
Less effective	0.3287	-0.3255

Subject Actual Group Classification Compared to Subject Probable Classification

Initially each individual was categorized into one of three actual classifications: more effective substitute teacher, moderately effective substitute teacher, and less effective substitute teacher. The discriminant function analysis computed discriminant scores for each individual based upon summing the products of each individual's variable score and that variable's corresponding discriminant coefficient as a part of one discriminant function. The discriminant scores of the first discriminant function, which accounted for 63.4% of the variance among the groups, were used to predict group membership for each individual. Table 16 contains the summary data used to compare each individual's actual group classification to predicted group classification.

Table 16

Individual Actual Group Classification Compared to Subject Predicted Classification for Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Individual	Actual Group Classification	Predicted Group Classification	Discriminant Score
1	1	1	0.1439
2	1	1	0.4733
3	3	1*	0.8924
4	3	3	-1.8927
5	3	3	-1.6388
6	3	2*	-0.0986
7	3	3	-1.5216
8	3	3	-0.7616
9	1	3*	-0.2563
10	2	1*	0.7134
11	1	3*	-0.5695
12	3	3	-0.2054
13	3	1*	0.0654
14	3	3	-0.2778
15	3	3	-1.4095
16	2	3*	-1.7063
17	3	3	-0.8730
18	2	3*	-1.6347
19	3	3	-0.7510
20	3	1*	0.7560
21	2	2	-0.3673
22	2	1*	0.9968
23	2	1*	0.6196
24	3	2*	-0.3673
25	1	1	2.1022
26	3	3	-1.6383
27	2	3*	-1.4331
28	1	1	0.4941
29	2	1*	0.4384
30	1	2*	0.6040
31	3	1*	-0.1567
32	3	3	-1.6573
33	2	1*	0.9031
34	2	3*	-1.6843
35	2	1*	1.2316
36	3	3	-1.5433
37	3	3	-1.5927
38	2	2	0.3609
39	2	3*	-1.2714
40	3	1*	1.2762
41	3	3	-1.0673
42	3	1*	1.0452

Table 16-Continued

Individual	Actual Group Classification	Predicted Group Classification	Discriminant Score
43	3	1*	0.5031
44	1	1	-0.0691
45	2	3*	-1.2293
46	3	3	-1.8517
47	3	1*	1.1651
48	1	3*	-1.5173
49	2	1*	0.8362
50	1	2*	-0.2064
51	3	3	-1.3478
52	3	3	-1.2860
53	3	3	-1.5576
54	2	1*	1.0344
55	2	3*	-0.6631
56	1	1	1.1269
57	2	1*	1.1515
58	3	2*	1.1460
59	2	1*	-0.1433
60	2	2	1.0835
61	1	2*	1.0883
62	1	1	0.0101
63	1	1	0.5278
64	1	1	0.1719
65	1	2*	0.0260
66	3	1*	1.1444
67	2	3*	-1.4540
68	3	3	-1.0760
69	3	3	-1.4025
70	3	3	-1.5117
71	3	3	-1.7256
72	3	3	-1.4785
73	1	3*	-0.6382
74	3	1*	-0.3706
75	3	2*	0.4605
76	3	1*	0.4363
77	3	3	-0.6830
78	3	3	-1.3079
79	2	2	0.1170
80	1	2*	-0.1734
81	1	1	0.4769
82	2	2	0.4085
83	3	3	-1.5352
84	2	3*	-0.5457
85	2	3*	-0.0432
86	1	3*	-0.9806
87	1	1	0.5176
88	2	2	0.9440

Table 16-Continued

Individual	Actual Group Classification	Predicted Group Classification	Discriminant Score
89	1	1	0.5277
90	3	3	-1.0466
91	1	1	-0.2157
92	2	3*	-0.9050
93	2	2	-0.2354
94	3	3	-0.9199
95	1	3*	-1.4916
96	3	1*	-0.1646
97	3	1*	0.4420
98	1	2*	0.3749
99	1	1	-0.5232
100	2	3*	-1.1069
101	2	2	0.2544
102	2	1*	1.2336
103	1	2*	0.3749
104	1	1	-0.1495
105	2	1*	0.3384
106	1	2*	0.2646
107	2	2	0.5257
108	1	1	1.2065
109	2	1*	0.2096
110	1	2*	0.3794
111	2	1*	0.2210
112	1	3*	-0.8568
113	3	3	-0.4735
114	2	2	0.6958
115	3	2*	0.0565
116	3	3	-1.2076
117	1	1	-0.2773
118	2	3*	-1.1297
119	3	2*	0.1004
120	2	2	0.2287
121	2	3*	-1.1240
122	3	1*	1.1348
123	1	3*	-0.6326
124	3	3	-0.6000
125	1	1	-0.1239
126	2	2	0.7003
127	2	1*	0.5481
128	1	3*	-1.3798
129	3	2*	0.6921
130	2	3*	-0.8116
131	2	1*	1.9468
132	2	3*	-1.0473
133	2	1*	1.4811
134	2	2	1.5382

Table 16-Continued

Individual	Actual Group Classification	Predicted Group Classification	Discriminant Score
135	1	1	1.2294
136	1	1	0.0137
137	3	3	-0.9207
138	2	3*	-0.9559
139	2	1*	0.1184
140	1	1	1.4335
141	3	3	-1.1312
142	2	3*	-0.9435
143	2	1*	-0.3611
144	3	3	-0.7339
145	1	2*	0.5895
146	3	3	-0.9549
147	3	1*	1.2471
148	1	1	-0.1123
149	2	2	-0.2266
150	3	3	-0.8038
151	2	2	1.0116
152	3	3	-0.8631
153	1	1	1.8944
154	2	3*	-0.4390
155	2	3*	-0.9522
156	2	3*	-0.4451
157	3	3	-0.5274
158	2	3*	-0.7989
159	3	3	-0.7617
160	3	2*	0.4244
161	1	2*	-0.6933
162	1	3*	-0.5238
163	1	2*	1.0775
164	1	3*	-0.8436
165	2	2	0.8851
166	3	3	-0.7159
167	1	3*	-0.5951
168	1	2*	2.1360
169	3	1*	0.1511
170	3	3	-0.8660
171	1	3*	-0.5289
172	2	1*	2.3283
173	3	2*	1.5596
174	2	2	1.0685
175	2	2	-0.6884
176	1	1	2.6982
177	1	2*	2.0777
178	2	2	-0.5123
179	2	2	1.2684
180	2	2	-0.4532
181	3	3	-0.7027

Table 16-Continued

Individual	Actual Group Classification	Predicted Group Classification	Discriminant Score
182	1	2*	-0.3374
183	2	2	-0.3548
184	3	1*	0.0299
185	2	1*	0.3655
186	1	2*	1.4859
187	2	2	0.0603
188	2	2	1.7753
189	3	1*	0.6663
190	3	2*	-0.3348
191	3	2*	0.0243
192	3	2*	-0.2805
193	2	2	-0.3554
194	1	2*	2.1653
195	1	2*	1.9161
196	2	1*	1.6807
197	3	2*	0.0288
198	2	2	0.6182
199	2	2	1.6605
200	2	1*	2.0989
201	1	1	2.4968
202	2	2	0.1844
203	3	2*	-0.1164
204	3	1*	1.0538
205	2	2	3.1337
206	2	2	0.8042

Note. 1 = rated less effective; 2 = rated moderately effective; and 3 = rated more effective.

Note. Asterisks (*) refers to case where actual group classification was not the same as predicted group classification, thus the individual was misclassified.

Classification Results

The end product of the discriminant function analysis process was to discover the degree to which the variables could be used to predict probable group membership of substitute teachers not yet employed. A comparison of actual group membership of the sample of substitute teachers to their predicted group membership based upon their discriminant scores was utilized to analyze the predictability of the variables.

Of the 75 substitute teachers rated as more effective, 42 (56.0%) were predicted to be in the more effective group, 14 (18.7%) were predicted to be in the moderately effective group, and 19 (25.3%) were predicted to be in the less effective group. Of the 75 substitute teachers rated as moderately effective, 22 (29.3%) were predicted to be in the more effective group, 30 (40.0%) were predicted to be in the moderately effective group, and 23 (30.7%) were predicted to be in the less effective group. Of the 56 substitute teachers rated as less effective, 13 (23.2%) were predicted to be in the more effective group, 18 (32.1%) were predicted to be in the moderately effective group, and 25 (44.6%) were predicted to be in the less effective group. The percentage of the total sample predicted to be in the same group to which they were actually rated was 47.09. Table 17 contains the summary data of actual group classification compared to predicted group classification of the substitute teachers.

Table 17

Actual Group Classification Compared to Predicted Group Classification of Substitute Teachers Rated as More Effective, Moderately Effective, and Less Effective

Actual Classification		Predicted Classification					
		More Effective		Moderately Effective		Less Effective	
Substitute Group	N	N	%	N	%	N	%
More Effective	75	42	56.0*	14	18.7**	19	25.3**
Moderately Effective	75	22	29.3**	30	40.0*	23	30.7**
Less Effective	56	13	23.2**	18	32.1**	25	44.6*

Note. * = correctly classified.
Note. ** = incorrectly classified.

Pearson Correlation Matrix

Pearson correlations were computed to further understand the magnitude of the relationship between one variable and another variable. The rating category (the groups into which the individuals had been classified) was treated as a variable for the purposes of the Pearson correlation. The level of significance was established at p=0.05. Teacher education courses correlated with regular teacher certification (0.7234, p=0.000), work experience (0.6071, p=0.000), level of education (0.5557, p=0.000), appraisal (0.3317, p=0.000), rating (0.2147, p=0.001), age (0.1323, p=0.029) and sex (-0.1182, p=0.045). Level of education correlated with teacher education courses (0.5557, p=0.000), regular teacher certification (0.5502, p=0.000), work experience (0.4701, p=0.000), appraisal (0.3492, p=0.000), sex (0.1652, p=0.009), and age (0.1467, p=0.018). Regular teacher certification correlated with teacher education courses (0.7234, p=0.000), work experience (0.5547, p=0.000), level of education (0.5502, p=0.000), appraisal (0.2459, p=0.000). age (0.1841, p=0.004), and rating (0.1307, p=0.031). Work experience correlated with teacher education courses (0.6071, p=0.000), regular teacher certification (0.5547, p=0.000), level of education (0.4701, p=0.000), age (0.2586, p=0.000), appraisal (0.2240, p=0.001), and sex (-0.1785, p=0.005). Appraisal correlated with level of education (0.3492, p=0.000), teacher education courses (0.3317, p=0.000), regular teacher certification (0.2459, p=0.000), work experience (0.2240, p=0.001), and rating (0.1618, p=0.010). Age correlated with work experience (0.2586, p=0.000), regular teacher certification (0.1841, p=0.004), level of education (0.1467, p=0.018), teacher education courses (0.1323, p=0.029), and marital status (-0.2650, p=0.000). Rating correlated with teacher education courses (0.2147, p=0.001), appraisal (0.1617, p=0.010), regular teacher certification (0.1307, p=0.031), sex (-0.1556, p=0.013), and race (-0.1218, p=0.041). Sex correlated with level of education (0.1652, p=0.009), work experience (-0.1785, p=0.005), rating (-0.1556, p=0.013), and teacher education courses (-0.1182, p=0.045). Marital status correlated with race (0.1260, p=0.036) and age (-0.2650, p=0.000). Race correlated with marital status (0.1260, p=0.036) and rating (-0.1218, p=0.041). All other correlations were not significant at the p=.05 level. Table 18 contains this summary data of Pearson correlations on the variables used to classify substitute teachers as more effective, moderately effective, and less effective.

Interpretation of the Discriminant Function Data

The interpretation of the discriminant function data involved four considerations: the significance of the discrimination functions, a comparison of the group centroids, the relative contributions of the variables, and classification results. The Discriminant subprogram of SPSS produced five statistical calculations that enabled the researcher to interpret the data: eigenvalue, percent of variance, canonical correlations, Wilks' lambda, and chi-square. The purpose of this section is to interpret the data obtained from these statistical calculations.

Significance of the Discriminating Functions

The eigenvalue of a particular function represents the total sum of the variance existing in the discriminating variables. The function containing the eigenvalue with the greatest magnitude represents the function with the greatest discriminating power. Function 1 with an

Table 18

Pearson Correlation Matrix on the Variables Used to Classify Substitute Teachers as More Effective, Moderately Effective, and Less Effective

Variable	Rating	Age	Race	Sex	Marital Status	Level of Education	Teacher Education Courses	Regular Teacher Certification	Work Experience	Appraisal
Rating	-- --	-0.0730 P=0.148	-0.1218 P=0.041	-0.1556 P=0.013	0.0161 P=0.409	0.0777 P=0.134	0.2147 P=0.001	0.1307 P=0.031	0.1007 P=0.075	0.1617 P=0.010
Age	-0.0730 P=0.148	-- --	-0.0087 P=0.450	-0.0637 P=0.182	-0.2650 P=0.000	0.1467 P=0.018	0.1323 P=0.029	0.1841 P=0.004	0.2586 P=0.000	-0.0583 P=0.203
Race	-0.1218 P=0.041	-0.0087 P=0.450	-- --	0.1026 P=0.071	0.1260 P=0.036	0.0468 P=0.252	-0.0321 P=0.323	-0.0075 P=0.457	0.0079 P=0.455	0.0149 P=0.416
Sex	-0.1556 P=0.013	-0.0637 P=0.182	0.1026 P=0.071	-- --	-0.0552 P=0.215	0.1652 P=0.009	-0.1182 P=0.045	-0.0629 P=0.184	-0.1785 P=0.005	-0.0247 P=0.362
Marital Status	0.0161 P=0.409	-0.2650 P=0.000	0.1260 P=0.036	-0.0552 P=0.215	-- --	-0.0242 P=0.365	-0.0707 P=0.156	-0.0753 P=0.141	-0.0705 P=0.157	0.0103 P=0.441
Level of Education	0.0777 P=0.134	0.1467 P=0.018	0.0468 P=0.252	0.1652 P=0.009	-0.0242 P=0.365	-- --	0.5557 P=0.000	0.5502 P=0.000	0.4701 P=0.000	0.3492 P=0.000
Teacher Education Courses	0.2147 P=0.001	0.1323 P=0.029	-0.0321 P=0.323	-0.1182 P=0.045	-0.0707 P=0.156	0.5557 P=0.000	-- --	0.7234 P=0.000	0.6071 P=0.000	0.3317 P=0.000
Regular Teacher Certification	0.1307 P=0.031	0.1841 P=0.004	-0.0075 P=0.457	-0.0629 P=0.184	-0.0753 P=0.141	0.5502 P=0.000	0.7234 P=0.000	-- --	0.5547 P=0.000	0.2459 P=0.000
Work Experience	0.1007 P=0.075	0.2586 P=0.000	0.0079 P=0.455	-0.1785 P=0.005	-0.0705 P=0.157	0.4701 P=0.000	0.6071 P=0.000	0.5547 P=0.000	-- --	0.2240 P=0.001
Appraisal	0.1617 P=0.010	-0.0583 P=0.203	0.0149 P=0.416	-0.0247 P=0.362	0.0103 P=0.441	0.3492 P=0.000	0.3317 P=0.000	0.2459 P=0.000	0.2240 P=0.001	-- --

eigenvalue of 0.1105 had 1.9 times the discriminating power of function 2 with an eigenvalue of 0.0638. Converting the eigenvalues into a percentage of variance revealed that 63.4% of the variance was accounted for in function 1 and 36.6% of the variance was accounted for in function 2.

Another calculation used to evaluate the discriminating power of the functions was the canonical correlation coefficient. These coefficients summarize the relationships between groups and the discriminant function on a scale from 0 to +1. Function 1 had a canonical coefficient of 0.3154 and function 2 had a canonical coefficient of 0.2448. A high coefficient would have indicated a strong relationship existed between the groups and the discriminant functions. Similarly, a low coefficient would have indicated a weak relationship existed between the groups and the discriminant functions. An examination of the percentage of variance and the canonical correlation coefficient provided no conclusive evidence regarding either functions' discriminating powers.

A Wilks' lambda was computed to determine residual discrimination, the degree to which the variables discriminate among the groups beyond the information taken from the previously computed functions. A Wilks' lambda of 1 would have indicated no group differences while a Wilks' lambda near 0 would have indicated high discrimination among the groups. In this study, function 1 had a Wilks' lambda of 0.8465 and function 2 had a Wilks' lambda of 0.9400. These two Wilks' lambda values were then converted into chi-square statistics to determine their significance. Function 1 had a chi-square of 13.15 with

18 degrees of freedom. Function 2 had a chi-square of 12.30 with 8 degrees of freedom.

Function 1's chi-square equated to a level of significance of 0.0160. Function 2's chi-square equated to a level of significance of 0.1383. Employing an acceptable level of significance equal to 0.05, function 1 was accepted as the only viable discriminant function in this study. Since function 2 was not significant at the 0.05 level, function 2 is eliminated from further discussion.

Comparison of Group Centroids

A group centroid, the mean of all the functions for a single group, was calculated for each group and evaluated to determine if there existed real differences among the groups. If no differences had existed, the centroids would have been identical. The centroids for each of the groups were as follows: substitute teachers rated more effective, -0.4295; substitute teachers rated moderately effective, 0.1840; and substitute teachers rated less effective, 0.3287.

Relative Contributions of the Variables

Standardized coefficients were used to determine which variables contributed the most to determining the discriminant scores in the function. Since the coding of the variables affected the coefficient signs, the absolute value of each coefficient was used to compare the relative contribution of each variable to the function. The standardized coefficients of function 1's variables, in descending order regarding absolute value, were as follows: teacher education courses (-0.6875), age (0.4983), sex (0.4347), race (0.2763), level of education (-0.1630), appraisal (-0.1468), marital status (0.0709), work experience (0.0677), and regular teacher certification (0.0542). Based upon this standardized coefficient data, the teacher education courses variable contributed the most toward discriminating among groups.

Wilks' lambdas were computed to determine what the probability was that the degree of variable discrimination could have been attributed purely to sampling, assuming no group differences existed in the population. The variables listed in ascending order of that probability were as follows: teacher education courses (p=0.004), appraisal (p=0.051), race (p=0.082), level of education (p=0.101), regular teacher certification (p=0.108), age (p=0.112), sex (0.191), work experience (p=0.225), and marital status (p=0.845). Only the variable teacher education courses was significant at the p=0.050 level.

The pooled within-groups canonical correlations between the discriminating variables and discriminant function 1 were computed as another measure of each variable's discrimination power. The nine variables were divided into two sets with regard to variable discrimination power. These two sets consisted of the two groups of variables which most highly correlated to the function. One of the sets was identified as primary in that these variables, as a group, accounted for a greater amount of the total discrimination power of the function than did the secondary group. Once the two sets were established, correlations with the discriminant function were completed analogous to a regression process. A correlation coefficient was computed comparing the function and that variable which contributed the most to the discrimination power of the function. This variable was removed from any further computations and the remaining variables were computed correlations coefficients in a like manner. Since the coding of the variables affected the correlation coefficient signs, the absolute value of each correlation coefficient was used to compare the relative discriminating power of the variables. Furthermore, only the variables contained in the primary set were considered more important for discussion. The primary variables, in descending order according to absolute value, were as follows: teacher education courses (-0.7084), regular teacher certification (-0.4444), race (0.4349), work experience (-0.3558), and sex (0.3097). Thus, the teacher education courses variable was again determined to be the variable that contributed the most toward discriminating among the groups.

The Pearson correlation matrix contained data regarding the relationship between one variable and a second variable. The teacher education courses variable had the three highest correlations within the matrix: regular teacher certification (0.723), work experience (0.607), and level of education (0.556). Thus, there appeared some justification to assume that these variables were measuring similar phenomena but in varying degrees.

Classification Results

Summarizing the classification results involved a comparison of actual group membership with predicted group membership. Each of the 206 individuals had a 0.333 probability of being randomly placed in the classification to which they had been categorized through the rating process. The discriminant function analysis utilized the variables to place each individual into a probable or predicted group. Of the 75 substitute teachers rated as more effective, 42 (56.0%) were predicted to be in the more effective group, 14 (18.7%) were predicted to be in the moderately effective group, and 19 (25.3%) were predicted to be in the less effective group. Of the 75 substitute teachers rated as moderately effective 30 (40.0%) were predicted to be in the moderately effective group, 23 (30.7%) were predicted to be in the less effective group, and 22 (29.3%) were predicted to be in the more effective group. Of the 56 substitute teachers rated in the less effective group, 25 (44.6%) were predicted to be in the less effective group, 18 (32.2%) were predicted to be in the moderately effective group, and 13 (23.2%) were predicted to be in the more effective group. Thus, the placement of substitute teachers into one of the three probable groups through use of the discriminant function analysis produced higher than random probability results.

CHAPTER IV

SUMMARY, DISCUSSION, AND CONCLUSIONS

Summary

The purpose of this study was to answer four questions regarding certain background variables of 206 substitute teachers employed by the Orange County Public Schools who had been rated by principals as more effective, moderately effective, or less effective. The background variables investigated were those about which data were available to the school district personnel department prior to the individual's actual employment as a substitute teacher.

Specifically, the answers were sought to the following questions:

1. What are the personal, educational, experiential, and appraisal variables of individuals rated as more effective substitute teachers?
2. What are the personal, educational, experiential, and appraisal variables of individuals rated as moderately effective substitute teachers?
3. What are the personal, educational, experiential, and appraisal variables of individuals rated as less effective substitute teachers?
4. What is the extent to which the personal, educational, experiential, and appraisal variables of substitute teachers discriminate among more effective substitute teachers, moderately effective substitute teachers, and less effective substitute teachers?

In seeking the answers to the first three questions, the researcher used the personnel records of the Orange County Public Schools to gather data on selected background variables of 206 substitute teachers. The background variables were categorized as personal, educational, experiential, or appraisal. The personal variables included data relating to age (in years as of the individual's last birthday), sex (male or female), race (white, black, Hispanic, or other), and marital status (married or not married). The educational variables included data regarding the level of education (high school graduate, college work without obtaining a degree, bachelor's degree, postbachelor's course work, and postbachelor's degree); teacher education courses (no or yes); and regular teacher certification (no or yes). The experiential variables included data relating to teaching experience, non-teaching related work experience, and non-related teaching experience. The appraisal variables included data regarding instructional qualities (enthusiasm for teaching, adaptability to new ideas, ability to discipline, planning and preparation, initiative and creativity, professional attitude, and general rank as a teacher) and professional/personal qualities (work/work habits, ability to work with others, ability to learn, dependability/attendance, attitude, judgment/common sense, initiative, health/ emotional stability, personality, and personal appearance).

Background Variables of Substitute Teachers Rated as More Effective

The data related to the personal variables of the 75 substitute teachers rated as more effective revealed that the group had a mean age of 35.51 with a standard deviation of 13.23 and a range of 21 to 72. The group consisted of 59 (78.7%) females and 16 (21.3%) males;

65 (86.7%) whites, 8 (10.7%) blacks, and 2 (2.6%) Hispanics; and 37 (49.3%) married individuals and 38 (50.7%) who were not married. The education for the more effective substitute teacher group showed that 40 (53.3%) held bachelor's degrees, 10 (13.3%) held post-bachelor's degrees, 10 (13.3%) had completed course work beyond the bachelor's degree, 9 (12.0%) had college course work without obtaining a degree, and 6 (8.0%) had completed high school. Furthermore, 53 (70.7%) had completed teacher education courses while 22 (29.3%) had no pedagogical course work; 37 (49.3%) possessed regular teacher certification while 38 (50.7%) were not certified as regular teachers. The data for the work experience variables revealed the more effective substitute teacher group contained 30 (40.0%) individuals who had teaching experience, 20 (26.7%) with non-teaching related experience, and 25 (33.3%) with non-related work experience. The data for the appraisal variables showed that the more effective substitute teacher group had a mean score of 70.02 with a standard deviation of 7.96 and a range of 50.75 to 83.00.

Background Variables of Substitute Teachers Rated as Moderately Effective

The personal data for the 75 substitute teachers rated as moderately effective revealed that the group had a mean age of 40.03 with a standard deviation of 14.15 and a range of 22 to 75. The group consisted of 53 (70.7%) females and 22 (29.3%) males; 62 (82.7%) whites, 11 (14.7%) blacks, 1 (1.3%) Hispanic, and 1 (1.3%) other; and 35 (46.7%) were married and 40 (53.3%) were not married. The data for the education variables of the moderately effective substitute teacher group showed that 43 (57.3%) held bachelor's degrees, 7

(9.3%) held post-bachelor's degrees, 2 (2.7%) had completed course work beyond the bachelor's degree, 9 (12.0%) had college course work without obtaining a degree, and 14 (18.7%) had completed high school. Thirty-seven (49.3%) had completed teacher education courses while 38 (50.7%) had no pedagogical course work; 26 (34.7%) possessed regular teacher certification while 49 (65.3%) were not certified as regular teachers. From the data relative to the work experience variables it was found that the moderately effective substitute teacher group contained 22 (29.3%) individuals who had teaching experience, 19 (25.3%) with non-teaching related experience, and 34 (45.4%) with non-related work experience. The data on the appraisal variables revealed that the moderately effective substitute teacher group had a mean score of 69.25 with a standard deviation of 8.01 and a range of 46.50 to 81.75.

Background Variables of Substitute Teachers Rated as Less Effective

The data relative to the personal variables for the 56 substitute teachers rated as less effective showed that the group had a mean age of 37.57 with a standard deviation of 11.67 and a range of 20 to 68. The group consisted of 34 (60.7%) females and 22 (39.3%) males; 40 (71.4%) whites, 13 (23.2%) blacks, and 3 (5.4%) Hispanics; and 29 (51.8%) were married and 27 (48.2%) were not married. The education data for the less effective substitute teacher group revealed that 24 (42.9%) held bachelor's degrees, 11 (19.6%) held post-bachelor's degrees, 2 (3.5%) had completed course work beyond the bachelor's degree, 10 (17.9%) had college course work without obtaining a degree, and 9 (16.1%) had completed high school. Also, 25 (44.6%) had completed teacher education courses while 31 (55.4%) had no pedagogical course work; 19 (33.9%) possessed regular teacher certification while 37 (66.1%) were not certified as regular teachers. The work experience data for the less effective substitute teacher group showed that 20 (35.7%) individuals had teaching experience, 8 (14.3%) had non-teaching related experience, and 28 (50.0%) had non-related work experience. The appraisal data revealed that the less effective substitute teacher group had a mean score of 66.75 with a standard deviation of 6.97 and a range of 48.50 to 80.00.

Comparisons Relative to Background Variables Among the Substitute Teacher Groups

Regarding the personal variables, substitute teachers rated as more effective had the lowest group mean age (35.51) while substitute teachers rated as moderately effective had the highest group mean age (40.03). All three groups were predominately female and the higher the percentage of females within the group, the higher along an effectiveness continum the group was rated: more effective (78.7% female), moderately effective (70.7% female), and less effective (60.7% female). All three groups were predominantly white and the higher the percentage of whites within the group, the higher the group was rated: more effective (86.7% white), moderately effective (82.7% white), and less effective (71.4% white). The groups were almost equally divided between being married and not married.

Regarding the education variables, all three groups had a high percentage of individuals holding college degrees and the higher that percentage the higher the effectiveness rating: more effective (80.0%), moderately effective (69.3%), and less effective (66.1%). Only the more effective group had a majority of individuals with teacher education courses (70.7%). However, the moderately effective group (49.3%) did have more individuals with pedagogical courses than the less effective group (44.6%). In no group did the majority of individuals hold certification as a regular teacher. This situation was partially explained by the fact that individuals who were eligible for certification chose not to become certified until they secured a regular teaching position. The percentages of individuals by group holding regular teacher certification were as follows: more effective (49.3%), moderately effective (34.7%), and less effective (33.9%).

Regarding the work experience variables, there existed an inverse relationship between non-related work experience and effective ratings: more effective (33.3%), moderately effective (45.4%), and less effective (50.0%). Related non-teaching experience corresponded to group rating: more effective (26.7%), moderately effective (25.3%), and less effective (14.3%). Both the more effective group (40.0%) and the less effective group (35.7%) had more individuals with teaching experience than did the moderately effective group (29.3%).

Regarding the appraisal variables, there existed a direct relationship between group rating and the group appraisal score mean: more effective (70.02), moderately effective (69.25), and less effective (66.75). This situation was partially explained by the employment process and possible biases of the individuals who appraised potential substitute teachers. Only individuals with good, very good, or excellent references were employed as substitute teachers. Thus, the appraisal variable scores clustered in the higher ranges of possible scores. These relatively higher scores were calculated primarily from data provided by the three individuals whom the substitute teacher had listed as references. The remaining component of each substitute teacher's appraisal score came from an interviewer within the personnel department of the school system. This latter component was consistent with the higher scores except for those potential substitute teachers who lacked teacher education courses, teaching experience, and regular teacher certification. Since the moderately effective and less effective groups contained more individuals lacking in those areas, the appraisal scores of those respective groups were lower than the more effective group.

In brief, there were observable differences among the three groups regarding many of the variables under investigation. With the exceptions of age, marital status, teacher education courses, and teaching experience, a direct relationship existed between the magnitude or direction of a variable and the effectiveness rating of a group. Specifically, group membership in the more effective group was characterized by relatively higher percentages of females, whites, individuals holding college degrees, individuals holding regular teacher certification, individuals having related non-teaching experience and individuals having higher appraisal scores; and a relatively lower percentage of non-related work experiences. Group membership in the less effective group was characterized by relatively lower percentages of females, whites, individuals holding college degrees, individuals holding regular teacher certification, individuals having non-teaching experience, and individuals having higher appraisal scores; and a relatively high percentage of non-related work experiences. Group membership in the moderately effective group was characterized by percentages which were between the percentages of the more effective and less effective groups with regard to females, whites, individuals holding college degrees, individuals holding regular teacher certification, individuals having non-teaching experience, individuals having high appraisal scores, and individuals having non-related work experience. The significance of these observable differences was investigated through the discriminant analysis process.

Discriminant Analysis Results

After a review of the discriminant analysis data, the researcher determined that measurable differences existed among the three substitute teacher groups. The differences in group centroids were deemed to be real differences. One discriminant function was significant at the p=.05 level which indicated there existed a weighted arrangement of the variables that could be used to discriminate among the groups. Within that function, one variable, teacher education courses, had the greatest discrimination power. This information was the basis upon which individuals were classified into predicted (probable) group membership.

A comparison between actual group membership and predicted group membership was used by the researcher to determine the degree to which the background variables discriminated among more effective, moderately effective, and less effective substitute teachers. Regarding the 75 substitute teachers rated as more effective, 42 (56.0%) individuals had a predicted group membership of more effective, 14 (18.7%) had a predicted group membership of moderately effective, and 19 (25.3%) had a predicted group membership of less effective. For the 75 substitute teachers rated as moderately effective, 30 (40.0%) individuals had a predicted group membership of moderately effective, 22 (29.3%) had a predicted group membership of more effective, and 23 (30.7%) had a predicted group membership of less effective. Of the 56 substitute teachers rated as less effective, 25 (44.6%) had a predicted group membership of less effective, 13 (23.2%) had a predicted group membership of more effective and 18 (32.1%) had a predicted group membership of moderately effective. The percentage of the total sample for which the actual group membership matched the predicted group membership was 47.09.

The random selection probability of actual group membership matching predicted group membership was .333. Thus, the results of the discriminant function analysis were greater than chance probabilities: more effective (.560), less effective (.446), and moderately effective (.400). However, the fact remained that 52.91% of the sample was misclassified using discriminant function analysis.

Discussion

The primary focus of the study was to determine the extent to which one could discriminate among the substitute teacher groups based upon the differences in selected background variables. Based on inspection of the descriptive statistics developed, there appeared to exist sufficient variability to characterize the groups as being different. One variable, teacher education courses, had the greatest discrimination power among the background variables investigated. Despite the differences which existed among the groups and the significance of one variable, a majority (52.91%) of the substitute teachers would have been misclassified based upon a discriminant analysis of the background variables studied.

There existed some justification for a more liberal interpretation of the classification data based upon literature published concurrently with the development of this study. Statistics were cited in one article regarding teacher demand and supply to the effect that the teacher shortage was estimated to be 11,000 in 1986 and was projected to be 278,000 by 1992 (Crisis, 1985). Currence (1985) stated that the problems of securing substitute teachers were "inextricably intertwined with the troubles school districts face in light of current and predicted shortages in the regular teaching force, teacher absenteeism, and the educational reform movement that is sweeping the country at the state level" (p. 20).

The information in these articles could lead one to argue that both the more effective and the moderately effective substitute teacher groups might be deemed acceptable employees. If this were the case, only 73 (35.44%) individuals would have been misclassified. These were substitute teachers who were rated as more effective (19) or moderately effective (23) and who had a predicted group membership of less effective; and the substitute teachers rated as less effective and who had predicted group memberships of more effective (13) or moderately effective (18).

When this liberal interpretation of the data was used as a basis for examining the study results for the sample of substitute teachers employed by the Orange County Public Schools, the researcher found that the district's existing procedure had resulted in a success rate higher than that based upon a discriminant function analysis of the background variables studied. That is, of the 206 substitute teachers in the sample who were employed using the district's existing procedure only 56 (27.2%) were rated ineffective; the remaining 150 (72.8%) individuals selected for employment were rated as more or moderately effective substitute teachers. In comparison, based on the discriminant analysis, 67 were predicted to be less effective and more than one half were misclassified.

Thus, the researcher found the discriminant analysis procedure using the background variables studied was less predictive than the district's employment procedure with regard to selecting substitute teachers. Given the findings there is no basis for suggesting a change in the existing procedure. However, the researcher noted that one variable, teacher education courses, had a magnitude of discrimination significant at the p=.01. The presence of pedagogical course work being the key discriminant among the groups suggests that training in education methodology for those employed who lack such preparation could be a means of increasing substitute teacher effectiveness.

Based upon the review of the literature, there is an obvious need for further research. Articles published concurrently with the development of the study supported this contention. In referring to the projected teacher shortages, one author depicted the same situation as did this researcher, "a dilemma for schools--quality vs. quantity" (Crisis, 1985). Although providing updated statistics regarding substitute teacher use, Currence (1985) restated the problem of finding effective substitute teachers in sufficient numbers by referring to literature written in the 1960's and 1970's. Thus, this researcher was not alone in finding a dearth of research regarding the effectiveness of substitute teachers.

Conclusions

Based upon the data gathered and analyzed in this study, the researcher concluded the following:

1. There exists numerous but insignificant differences among the substitute teachers in the sample with regard to the background variables studied.
2. The existing differences among the three study groups were sufficient to predict group membership with a probability greater than chance.
3. One variable, teacher education courses, had the most discriminating power of the background variables studied. This finding could be interpreted to mean that training in education methodology could be a means of increasing substitute teacher effectiveness.
4. The district's employment procedure used at the time of the study resulted in a higher percentage of more and moderately effective substitute teachers selected than would a procedure based upon a discriminant analysis of the background variables studied.

APPENDIX
PROFESSIONAL AND PERSONAL REFERENCE
PERSONNEL DEPARTMENT

APPENDIX

PROFESSIONAL AND PERSONAL REFERENCE
PERSONNEL DEPARTMENT

DATE ______________

______________________________ SSN: ______________________ has applied for a position with the Orange County Public Schools. Your name was given as a reference. We would appreciate your answers to the following questions, as well as any additional information you can supply that will help us make a judgement in employing this person. Please return the form in the enclosed envelope as soon as possible. Thank you.

1. How long have you known applicant? ______________________
2. What was applicant's position? ______________________
3. If applicant was your employee, what were employment dates? ____________
4. Do you know of any reason why the applicant should not work with or around children? ______________________
5. If a vacancy existed in your school or business for which the applicant was qualified, would you recommend him or her for employment? ____________

INSTRUCTIONAL (Please complete for teacher applicants only)	Excellent	Very Good	Good	Fair	Poor	Unknown
Enthusiasm for Teaching						
Adaptability to New Ideas						
Ability to Discipline						
Planning and Preparation						
Initiative and Creativity						
Professional Attitude						
General Rank as a Teacher						
PROFESSIONAL/PERSONAL QUALITIES (Please complete for all applicants)						
Quality of Work/Work Habits						
Ability to Work with Others						
Ability to Learn						
Dependability/Attendance						
Attitude						
Judgement/Common Sense						
Initiative						
Health/Emotional Stability						
Personality						
Personal Appearance						

Use this space for additional comments: ______________________

____

____

____

Signature ______________ Position ______________ Date __________

REFERENCES

Bloom, B. S. (1976). Human characteristics and school learning. New York: McGraw-Hill.

Bond, J. (1959). Analysis of observed traits of teachers rated superior in demonstrating creativeness in teaching. Review of Educational Research, 53, 7-12.

Coleman, J. S. (1966). Equality of educational opportunity. Washington, DC: U.S. Government Printing Office. (ERIC Document Reproduction Service No. ED 012 275)

Copeland, W. D. (1975). The relationship between mirco-teaching and student teacher classroom performance. Review of Educational Research, 68, 289-293.

Copeland, W. D., & Doyle, W. (1973). Laboratory skill training and student teacher classroom performance. Journal of Experimental Education, 42, 16-21.

Crisis in quality. (1985, January 7). Education U.S.A. pp. 137-139.

Crocker, A. C. (1974). Predicting teaching success. London: NFER Publishing.

Currence, C. (1985, April 3). Substitutes: The other teacher shortage. Education Week. pp. 1, 20-23.

Drake, J. M. (1981). Making effective use of the substitute teacher: An administrative opportunity. NASSP Bulletin, 65, 74-80.

Elliott, P. G., & Manlove, D. C. (1977). The cost of skyrocketing teacher absenteeism. Phi Delta Kappan, 59, 269-271.

Esposito, F. F. (1975). Improving the role of substitute teachers. NASSP Bulletin, 59(12), 47-50.

Freedman, M. K. (1975).The new substitutes: Free to teach! NASSP Bulletin, 59(5), 95-98.

Frosch, C. S. (1981). Food for thought: Proper utilization of the substitute teacher. NASSP Bulletin, 65(5), 68-71.

Garwood, S.G. (1976). Ten ways to prevent classroom chaos. Teacher, 94 (2), 75.

Hall, H. O. (1964). Professional preparation and teacher effectiveness. Journal of Teacher Education, 15, 72-76.

Harnischfeger, A., & Wiley, D.E. (1975). Schooling cutbacks and achievement declines: "Can we avert them?" *Administrator's Notebook*, *25*, 26-30.

Harris, C.S. (1982). The responses of teacher educators to the shortage of teachers in Texas. *Phi Delta Kappan*, *64*, 287.

Hayes, M. J. (1975). Stranger in the classroom. *Phi Delta Kappan*, *57*, 270-272.

Heckman, M. (1981). Substitutes are teachers, too! *Phi Delta Kappan*, *63*, 66.

Heikkinen, M. W. (1982). On the supply of science and math teachers in Idaho. *Phi Delta Kappan*, *64*, 288.

Hunt, D. E., & Joyce, B. R. (1967). Teacher trainee personality and initial teaching style. *American Educational Research Journal*, *4*, 253-259.

Jentzen, A. E., & Vockell, E. L. (1978). Substitute teachers: Current status and some suggestions for improvement. *NASSP Bulletin*, *62* (416), 84-8.

Keller, S. A. (1976). Dear teacher, while you were gone. *Teacher*, *94* (2), 76-77.

Klecka, W. R. (1980). *Discriminant analysis.* (Series: Quantitative applications in the social sciences.) Beverly Hills, CA: Sage Publications.

Kraft, D. W. (1980). New approaches to the substitute teacher problem. *NASSP Bulletin*, *64*(9), 79-86.

Leal, D. (1969). How to help your substitute. *Grade Teacher*, *87*(2), 105-106.

Levin, H. M. (1968). *Cost-effectiveness analysis and educational policy profusion, confusion, promise*. Stanford, CA: Stanford University. (ERIC Document Reproduction Service No. ED 085-896)

LuPone, O. J. (1961). A comparison of provisionally certified and permanently certified elementary school teachers in selected school districts in New York State. *Journal of Educational Research*, 55, 53-63.

McIntire, R. G., & Hughes, L. W. (1982). Houston program trains effective substitutes. *Phi Delta Kappan*, *63*, 702.

Morgan, R. (1979). Teacher race and experience as contributing factors in the reading and mathematics achievement of majority black classes of pupils in pupil-segregated schools (Doctoral dissertation, University of Pennsylvania, 1976). *Dissertation Abstracts International*, *37*, 5501A-5502A. (University Microfilms No. 77-4678)

New York Office of Education Performance Review, State of New York (1974). *Teacher absenteeism in New York City and the cost effectiveness of substitute teachers*. Albany, NY: Author.

Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K., & Bent, D. H. (1975). SPSS: Statistical package for the social sciences. New York: McGraw-Hill.

Olson, M. N. (1971). Identifying quality in school classrooms: Some problems and some answers. Metropolitan School Study Council Special Report. 29.

Orange County Public Schools. Orange county public schools enrollment summary. Orlando, FL: Author, 1984.

Orange County Public Schools. Orange county public schools statistical report. Orlando, FL: Author, 1984.

Porwoll, P. J. (1977). Practices and procedures in the use of substitute teachers. Arlington, VA: Educational Research Service, Inc.

Pronin, B. (1983). Guerrilla guide to effective substitute teaching. Instructor, 92, 64-68.

Rawson, D. V. (1981). Increasing the effectiveness of substitute teachers. NASSP Bulletin, 65(9), 81-85.

Reynolds, D. J., & Garfield, L. (1971). Retraining substitute teachers for the urban high school. NASSP Bulletin, 55(4), 80-88.

Robb, H. E. (1979). Decline and fall of the substitute teacher. Journal of Teacher Education. 30(2), 27-30.

Rosenshire, B. & Berliner, D. C. (1978). Academic engaged time. British Journal of Teacher Education, 4, 3-16.

Ryans, D. G. (1958). A note on activities of teachers during childhood and adolescents. California Journal of Educational Research, 9, 57-59.

Ryans, D. G. (1960). Characteristics of teachers. Washington, DC: American Council on Education.

Schalock, D. (1979). Research on teacher selection. In D. C. Berliner (Ed.), Review of research in education (pp. 364-417). Washington DC: American Educational Research Association.

See, H. (1970). A substitute's problems. Today's Education, 59 (2) 58-59.

Shields, J. J., Jr., & Daniele, R. (1980). Teacher selection and retention. In H. E. Mitzel, J. H. Best & W. Rabinowitz (Eds.), Encyclopedia of educational research: Volume 4 (pp. 1909-1918). New York: The Free Press.

Stashower, G. (1974). Is there a substitute for substitutes? School Management, 18(4), 24-27.

Turner, R. L. (1963). Task performance and teaching skill in the intermediate grades. Journal of Teacher Education, 14, 299-307.

Turner, R. L. (1975). An overview of research in teacher education. In K. Ryan (Ed.), Teacher education. The seventy-fourth yearbook of the National Society for the Study of Education: Part II (pp. 87-110). Chicago: University of Chicago Press.

Vernon, P. E. (1965). Personality factors in teacher training selection. British Journal of Educational Psychology, 35, 140-149.

Woods, L. L., & Woods, T. L. (1974). Substitute: A psychological study. Elementary School Journal, 74, 162-167.

BIOGRAPHICAL SKETCH

W. James Halscott was born in Cincinnati, Ohio, in 1942. He is the first of two sons of William and Helen Halscott. After completing his elementary and secondary education in the Cincinnati Public Schools, he attended the Ohio State University where he completed the requirements for the Bachelor of Arts degree in history in June, 1965.

He completed the requirements for a Master of Arts degree in guidance and counseling at Villanova University in December, 1968. While in the Philadelphia area, he taught social science for four years in a school for varying exceptionalities and was a guidance counselor for three years in neighboring public school districts. In 1972, he moved to Oviedo, Florida, and was employed as a guidance counselor by the Orange County Public Schools. After two and a half years at Meadowbrook Junior High School he was selected to be an assistant principal at Walker Junior High School. From 1979 to 1984, he served in the position of Administrator of Pupil Assignment. Currently, he is the Director of Personnel for the Orange County Public Schools. His doctorate was earned in educational leadership in 1985.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

Michael Y. Nunnery, Chairman
Professor of Educational Leadership

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

James A. Hale
James A. Hale
Professor of Educational Leadership

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

Joseph Shea.
Joseph J. Shea
Associate Professor of Instruction and Curriculum

This dissertation was submitted to the Graduate Faculty of the College of Education and to the Graduate School, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Education.

August 1985

David C. Smith Ⓝ
Dean, College of Education

Dean, Graduate School